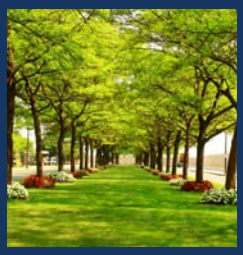
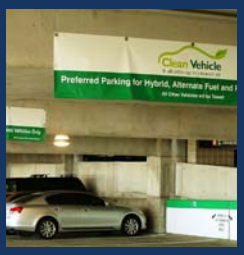
Boston-Logan International Airport







2007 EDR Environmental Data Report



EOEA #3247
September 2008

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1

Introduction/ Executive Summary

Introduction

Boston-Logan International Airport (Logan Airport or Airport), owned and operated by the Massachusetts Port Authority (Massport), is New England's primary international and domestic airport. This *Boston-Logan International Airport 2007 Environmental Data Report (2007 EDR)* is one of a series of annual environmental review documents submitted pursuant to the Massachusetts Environmental Policy Act (MEPA) to report on the cumulative environmental effects of Logan Airport's operations and activities. EDRs provide a review of environmental conditions for the reporting year compared to the previous year. Every five years Massport prepares an Environmental Status and Planning Report (ESPR), which provides an historical and prospective view of Logan Airport.

The scope of this *2007 EDR* is set out in the Secretary of the Executive Office of Energy and Environmental Affairs' (EEA) Certificate dated November 1, 2007, which is included in *Appendix A, MEPA Certificate and Responses*. This *2007 EDR* updates and compares the data presented in the *2006 EDR*, and presents activity levels (including aircraft operations and passenger activity) and environmental conditions at Logan Airport for calendar year 2007. To enhance the usefulness of the *2007 EDR* as a reference document for reviewers, this *2007 EDR* also presents historic data on the environmental conditions at Logan Airport dating back to 1990 in instances where historical information is available. Historic data are generally included in the technical appendices. *Chapter 3, Airport Planning* provides update on the projects underway at Logan Airport in 2007. *Chapter 9, Project Mitigation Tracking* describes the status of project mitigation measures. In this *Chapter 1, Introduction/Executive Summary*, an overview of Massport's sustainability initiatives is also provided.

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Logan Airport Environmental Review Process

This *2007 EDR* is part of an ongoing state-level environmental review process that assesses Logan Airport's cumulative environmental impacts. The process provides a context against which individual projects meeting state and federal environmental thresholds are evaluated on a project-specific basis. The Airport-wide and project-specific environmental review processes are described below.

Logan Airport-Wide Review

In 1979, the Secretary of the then-Executive Office of Environmental Affairs (EOEA) (now the EEA) issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the Airport through a Generic Environmental Impact Report (GEIR). The Certificate also required interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR evolved into an effective planning tool for Massport and provided projections of environmental conditions so that the cumulative effects of individual projects could be evaluated within a broader context.

EOEA eliminated GEIRs following the 1998 revisions to its MEPA Regulations. However, the Secretary's Certificate on the *1997 Annual Update*[1] proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with Logan Airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs. The next EDR will be filed in 2009 and will report on the 2008 calendar year. The next ESPR will be filed in 2010, and will report on the 2009 calendar year.

1 Certificate of the Secretary of the Executive Office of Environmental Affairs on the *Logan Airport 1997 Annual Update*, issued on October 16, 1998.

Project-specific Review

While this Airport-wide review provides the broad planning context for proposed projects and future planning concepts, Airport projects are also subject to a project-specific, public environmental review process when state environmental review thresholds are met. When necessary, Massport and Airport tenants submit Environmental Notification Forms (ENFs) and Environmental Impact Reports (EIRs) pursuant to MEPA.

Similarly, where National Environmental Policy Act (NEPA) environmental review thresholds are triggered, projects are reviewed under the Federal Aviation Administration (FAA) environmental review process.

Overview of Logan Airport

Logan Airport is New England's primary domestic and international airport. Logan Airport is an origin-destination airport, not a connecting hub for major airlines. The Airport plays a key role in the metropolitan Boston and New England passenger and freight transportation networks and is a significant contributor to the regional economy. In 2004, Logan Airport employed a total of approximately 12,000 people (a full time equivalency of 10,879 jobs) and activities associated with the Airport contributed an average of $19 million a day into the local economy.[2] According to FAA, in 2007 Logan Airport was the 17th busiest commercial aviation facility in the United States (U.S.) ranked by aircraft operations.[3]

The Airport boundary encompasses approximately 2,400 acres in East Boston and Winthrop, including 700 acres of Boston Harbor. Logan Airport, shown in Figures 1-1 and 1-2, is one of the most land-constrained airports in the nation and is surrounded on three sides by Boston Harbor.

Logan Airport is close to downtown Boston and is accessible via public transit and a well-connected roadway system. The airfield comprises six runways, 14 miles of taxiway, and approximately 240 acres of concrete and asphalt apron. The sixth runway, the 5,000 foot unidirectional Runway 14-32, became operational on November 23, 2006. The first full year of operation of Runway 14-32 was 2007. Logan Airport has four passenger terminals (Terminal A, B, C and E), each with its own ticketing, baggage claim, and ground transportation facilities. Massport continues to evaluate and implement enhancements to Logan Airport's security, operational efficiency, and accessibility to and from the Boston metropolitan area, while carefully monitoring the environmental effects of Logan Airport operations.

2 *Economic Impact Report 2006*, Massachusetts Port Authority, 2006.
3 *Top 50 Busiest U.S. Airports for 2007* at www.faa.gov/news/updates/busiest_airports/index.cfm accessed on July 17,2008.

Figure 1-1 Aerial View of Logan Airport

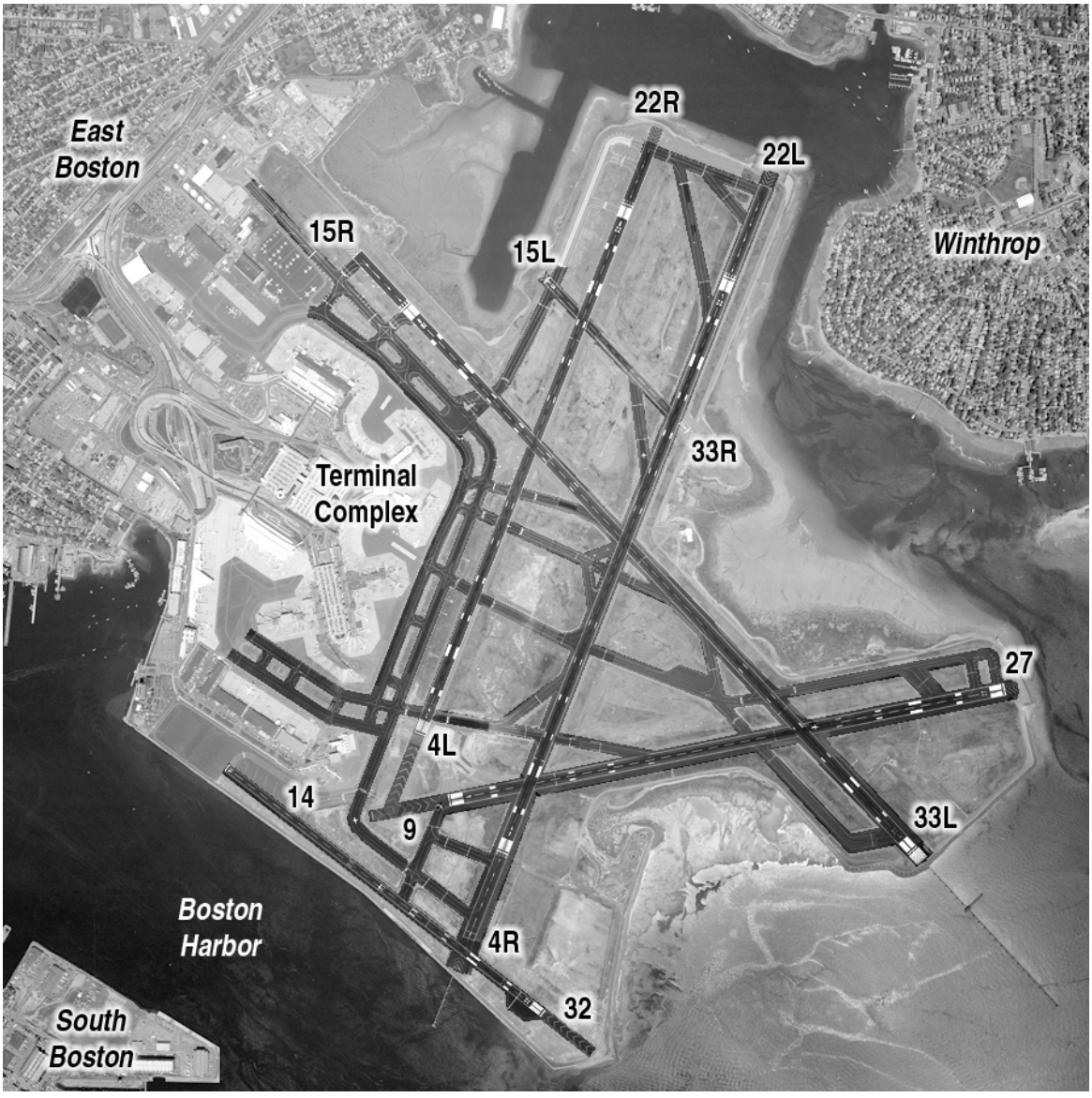
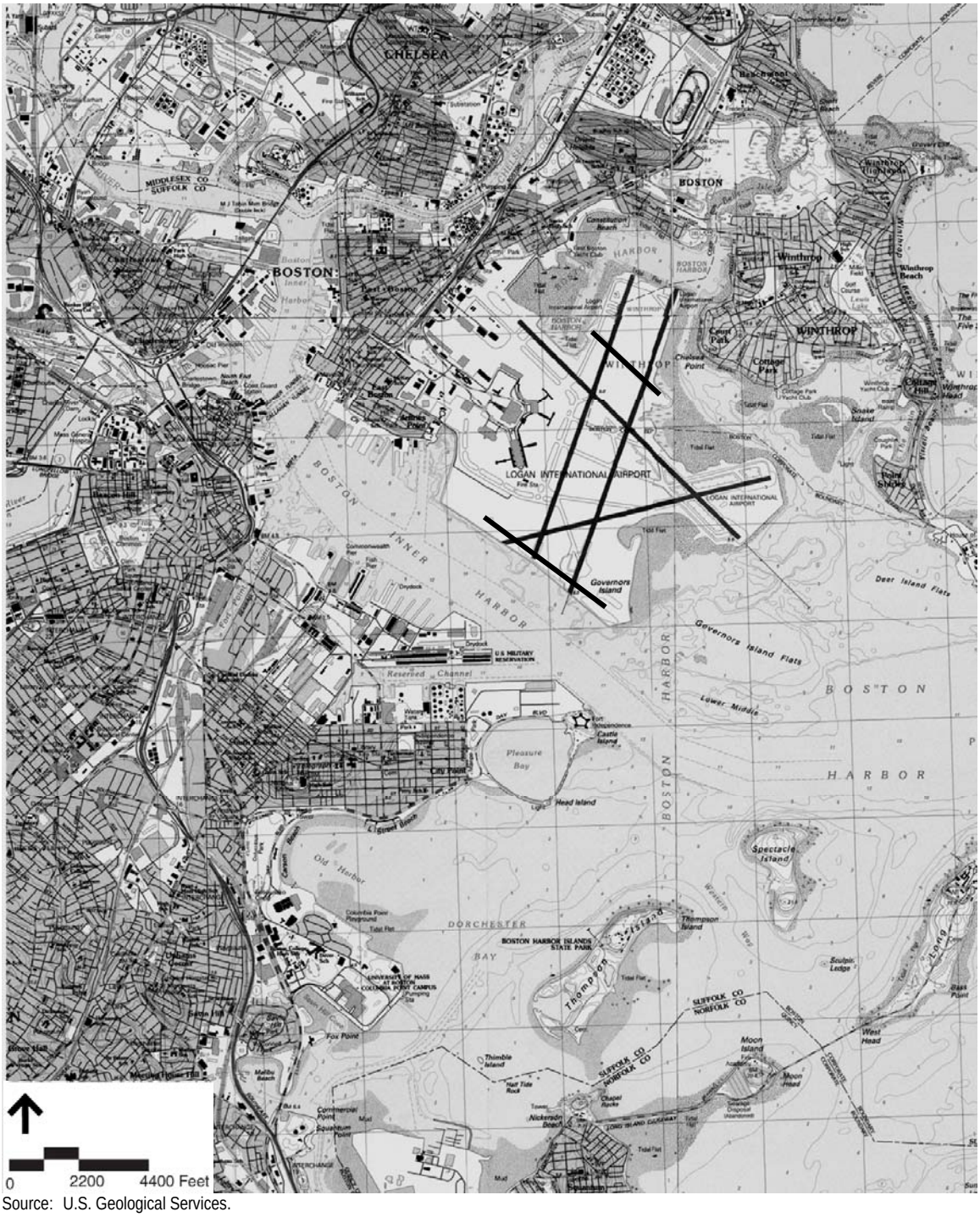


Figure 1-2 Logan Airport



Source: U.S. Geological Services.

2007 Highlights and Accomplishments

This section provides a brief overview of key events and accomplishments at Logan Airport in 2007. Additional information concerning all aspects of Airport activities is provided in subsequent chapters.

Activity Levels

- In 2007, the total number of air passengers reached 28.1 million, up from 27.7 million in 2006. The increase in the total number of air passengers at Logan Airport was 1.4 percent compared to 2.4 percent in the previous year.
- The total number of aircraft operations declined from 406,119 in 2006 to 399,537 in 2007, a decrease of 1.6 percent. Operations by general aviation (GA) aircraft decreased most significantly (8.9 percent) in 2007 as compared to passenger and cargo operations.
- As a result of continued passenger growth and a reduction in operations, the number of air passengers per aircraft operation continued to increase in 2007.
- Increase in the number of operations by low-cost carriers (LCCs) slowed and legacy airlines reduced their aircraft operations at Logan Airport in 2007 to deal with high and rising fuel prices and intense price competition throughout the industry.
- Air cargo volumes, excluding mail, continued the declining trend from 679 million pounds in 2006 to 632 million pounds in 2007 with the largest volume decrease occurring in the freight segment.
- The domestic airline industry managed to earn profits in 2007, but will face a challenging operating environment in 2008 and beyond if fuel prices continue to escalate, and the U.S. and global economies weaken.

Planning

In 2007:

- International Gateway Project (Terminal E) Phase 2 was completed. The Federal Inspection Services (FIS) facility was enlarged and the new arrivals level was constructed, with the other Phase 2 improvements (improvement of the meeter/greeter lobby and the ticketing area) having already been completed. A future phase, involving the construction of a new West Concourse with three new gates for wide-body aircraft, is also planned for completion after 2010.
- The replacement GA Facility in the North Cargo Area was completed and opened in June.
- The southwest corner of Taxiway D was realigned.
- The Terminal Area Roadway Landscaping was completed in 2007. Approximately 6 acres of land between the roadways and terminal areas have been landscaped, including land adjacent to the egress roadway (between the West Garage, Terminal E parking, the Central Cooling and Heating Plant, and the Citgo Station).
- Significant portions of Bremen Street Park were completed in early 2007, and the opening occurred on June 1. Final construction of the park will be completed in 2008.
- Phase II of the West Garage Project was completed. Phase II added three levels of parking (2,800 parking spaces) to the Central Garage.

Regional Transportation Context

- In addition to Logan Airport, which is New England's primary domestic and international airport, other primary commercial service airports include the following ten regional airports: T.F. Green Airport, RI; Manchester-Boston Regional Airport, NH; Bradley International Airport, CT; Burlington Airport, VT; Bangor Airport, ME; Portland International Jetport, ME; Pease International Tradeport, NH; Worcester Regional Airport, MA; Hanscom Field, MA; and Tweed-New Haven Airport, CT.
- The total number of air passengers using New England's primary commercial service airports in 2007 increased marginally, from 47.13 million in 2006 to 47.2 million. Of the 47.2 million air passengers using New England's primary commercial service airports in 2007, 60 percent utilized Logan Airport as compared to 88 percent in 1995. When measured by the number of aircraft operations, activity levels fell by 2.1 percent, from 1.33 million operations in 2006 to 1.31 million operations in 2007. This reflects substantial changes in the commercial aviation sector and the continued decline of GA nationally.
- Passenger traffic at the regional airports fell by 1.6 percent. The continued drop in passenger traffic at the regional airports is a reflection of the challenging operating environment facing U.S. airlines. Major airlines reduced capacity at the regional airports in 2007 as they eliminated unprofitable routes and reduced their domestic flying to deal with the high and rising cost of fuel.
- The average number of seats per scheduled flights to regional airports declined from 87 in 2006 to 84 in 2007 reflecting a general shift from service in mainline jets to smaller regional jets.
- Operations at New England regional airports by GA aircraft declined by 3.5 percent from 2006 levels. Declines in GA activity in New England continue to outpace declines in the rest of the country. According to the FAA, GA activity declined by 2.6 percent nationally in 2007, largely due to the impact of rising fuel costs on recreational flying.

Ground Transportation

- Ground transportation activity levels increased for all modes from 2006 to 2007 as a result of a 1.4 percent increase in the number of air passengers.
- The re-opening of Interstate 90 (I-90) connecting the City of Boston and areas to the south and west of Boston to Logan Airport resulted in increased traffic flows to and from the Airport when compared to previous years.
- In 2007, ridership on water transportation, scheduled and unscheduled high occupancy vehicle (HOV) services, and employee ridership on Logan Express increased over 2005 levels.[4] Passenger ridership on Logan Express decreased by 4.8 percent in 2007 as compared to 2005.
- Massachusetts Bay Transportation Authority's (MBTA) automated fare system (the Charlie Card) was fully implemented on January 1, 2007, eliminating the use of tokens.
- In 2007, the Logan Employee Transportation Management Association (Logan TMA) introduced and implemented three new programs to support employees' use of alternative transportation options: 1) Sunrise Shuttle, which provides shuttle services between 3:00 AM and 5:30 AM for Airport employees who reside in East Boston; 2) Logan TMA Preferential Carpooling, which provides free terminal garage parking to employees in Logan TMA member companies who carpool in groups of three or more; and

4 In 2006, ridership levels on most HOV services increased due to the temporary closure of I-90. Comparison of 2007 against 2005 therefore provides a more accurate trend analysis.

3) Commuter Cash program, which financially rewards employees ($3/day) who switch from driving alone to either carpooling, bicycling, walking, or using public transportation.

- The number of on-Airport parkers decreased by 16.9 percent in 2007 compared to 2005. A portion of this decrease is likely due to the increase of pick-up and drop-off at the Airport.

Noise Abatement

- 2007 was the first full year of operation for Runway 14-32. Consistent with the 2002 Record of Decision (ROD) on the Airside Improvements Planning Project EIS[5] and based on FAA data, the runway was used primarily for arrivals over Boston Harbor during 2007. Consistent with historical patterns, despite the introduction of Runway 14-23, the FAA continued to rely on Logan Airport's north-south traffic flow in 2007. However, within the north-west flow, the FAA increased reliance on Runway 33L for departures with an associated reduction in Runway 27 departures.
- The changes in runway utilization in 2007 have led to changes in the noise environment. Since 2006, the noise contours over East Boston increased in extent and, over the same period, decreased over South Boston, Revere, and Winthrop.
- The population within the 75-80 decibel (dB) DNL contours decreased in 2007 compared to 2006. In 2006, the population in the 75-80 dB DNL contour was 104 but in 2007 zero population was located in this coutour. In 2006, the population in the 70-75 dB DNL contour was 597 compared to 416 in 2007. The overall number of people exposed to Day-Night Sound Level (DNL) values greater than 65 decibels (dB) increased 36 percent compared to 2006. An estimated 7,591 people were exposed to DNL levels greater than 65 dB in 2007, compared to 5,583 in 2006. This is still well below the pre-September 11, 2001, level of 17,745. The residences exposed to DNL levels greater than 65 dB in 2007 are located within the 65 dB sound insulation contour, and thus are within areas that have been sound insulated by Massport.
- In 2007, Massport provided sound insulation to 548 homes, the majority of which were in Chelsea. Since the inception of Massport's Sound Insulation program, 10,461 homes in East Boston, South Boston, Winthop and Chelsea have received sound insulation.
- Massport continued the installation of an improved noise and operations monitoring system. The flight tracking system and most noise monitoring terminals were operational in 2007. The Airport's monitoring system now correlates noise events with individual flight tracks. This has greatly reduced differences between measured and modeled DNL values.

Air Quality/Emissions Reduction

- The emissions inventory results were driven largely by three factors: changes in the aircraft fleet mix at the Airport (the airlines' substitution of select narrow-body aircraft with wide-body and commuter aircraft); the reported change in the aircraft average taxi/delay times at Logan Airport; and continual improvements to the FAA Emissions and Dispersion Modeling System (EDMS), v5.0.2, particularly in regard to the advanced method for calculating particulate matter (PM) emissions from aircraft engines. The availability of Logan Airport-specific fuel type information for ground support equipment (GSE), the increased demand for indoor heating and outdoor snow-melting operations during the unusually severe winter season of 2007, and Massport's in-place air quality initiatives to minimize emissions at the Airport were also contributing factors.

5 *Logan Airside Improvements Planning Project*, Final Environmental Impact Statement, Boston Logan International Airport, Federal Aviation Administration June 2002.

- Because of the changes to the EDMS model, total modeled emissions of $PM_{10}/PM_{2.5}$ associated with Logan Airport in 2007 appeared to have increased by approximately 64 percent to 128 kilograms per day (kg/day) compared to 2006 levels. By comparison, using the EDMS version available in 2006 (v5.0.1) total emissions of $PM_{10}/PM_{2.5}$ would have increased by approximately 5 percent to 82 kg/day due to a combination of changes in aircraft fleet mix and aircraft taxi/delay time. This information shows that the estimated increase in $PM_{10}/PM_{2.5}$ was due mostly to the updated EDMS model and not the result of significant changes in Airport operations.
- Total emissions of volatile organic compounds (VOC) were 1,673 kg/day, or 3 percent lower than 2006 levels.
- Total emissions of carbon monoxide (CO) were 9,233 kg/day, or 13 percent higher than 2006 levels.
- Total emissions of oxides of nitrogen (NO_X) were 4,457 kg/day, or 7 percent higher than 2006 levels. In 2007, total NO_x emissions at Logan Airport were approximately 541 tons per year lower than the 1999 Air Quality Initiative (AQI) benchmark. This represents a 27 percent decrease in NO_x emissions at Logan Airport since 1999.
- There was a continuing trend of decreasing nitrogen dioxide (NO_2) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MA DEP) monitoring sites located in the general vicinity of Logan Airport. In addition, the annual NO_2 concentrations at all monitoring locations in 2007 were well within the NO_2 Air Quality Standards.
- Massport prepared its first emission inventory of greenhouse gas (GHG) emissions directly and indirectly associated with Logan Airport. "Direct emissions" are those that occur in areas located within the Airport's geographic boundaries and "indirect emissions" are those that occur off the Airport site. "Direct" GHG emissions associated with Logan Airport in 2007 were 0.37 million metric tons (MMT), and the sum of "direct" and "indirect" emissions was 0.69 MMT (less than 0.1 percent of state-wide totals). Massport has control of only 18 percent of these combined totals and will implement plans by 2009 to reduce further GHGs associated with its operations at Logan Airport helping minimize the Airport's carbon footprint.

Water Quality/Environmental Compliance and Management

- On July 31, 2007, the Environmental Protection Agency (EPA) and MA DEP issued a new National Pollutant Discharge Elimination System (NPDES) Program permit for Logan Airport's stormwater outfalls. The new NPDES permit regulates stormwater discharges from the North, West, Northwest, Porter Street, and Maverick Street Outfalls, and all of the airfield outfalls. The previous NPDES permit regulated stormwater discharges only from the North, West, Porter Street, and Maverick Street Outfalls. The new NPDES permit also has additional sampling requirements, including the requirement to sample for deicing compounds.
- In 2007, three of 404 outfall samples exceeded the regulatory limits contained in the NPDES permit. The Maverick Street Outfall had two samples exceed the 100 milligrams per liter (mg/L) daily maximum limit for Total Suspended Solids (TSS) and the West Outfall had one sample exceed this limit. This is an improvement compared to 2004 and 2006 when four samples exceeded the regulatory limits, and 2005 when eight samples exceeded the regulatory limits.
- In 2007, Massport completed an update to the Airport's Stormwater Pollution Prevention Plan (SWPPP). The SWPPP addresses stormwater pollutants in general, and also addresses deicing and anti-icing chemical, potential bacteria, fuel and oil, and other sources of stormwater pollutants. Best management practices (BMPs) are included in the SWPPP. The 27 co-permittees (Logan Airport tenants) to the new NPDES permit completed updated SWPPPs in early 2008.

- Of the 108 oil and hazardous material spills in 2007, seven (6 percent) were considered reportable (i.e., over 10 gallons) under the applicable environmental regulations. Jet fuel spills accounted for 66 (61 percent) of the total spills, with four of the jet fuel spills exceeding 10 gallons. The remaining 42 spills (39 percent) involved gasoline, hydraulic oil, diesel fuel, and other substances, including three reportable spills.
- In accordance with the Massachusetts Contingency Plan (MCP), Massport continued to assess, remediate, and bring to regulatory closure areas of subsurface contamination. In 2007, Massport worked towards achieving regulatory closure of six remaining MCP sites.
- In 2006, Massport began developing an environmental management system (EMS) for Logan Airport, specifically for facilities where fleet and field maintenance activities are conducted. ISO 14001 certification was obtained for Facilities II (vehicle maintenance, landscaping, and snow removal) in December 2006. Massport will likely obtain ISO 14001 certification for Facilities I (Central Heating and Cooling Plant) and III (Electrical and Structural) in 2008.

Sustainability at Logan Airport

Sustainability is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs."[6] In this capacity, Massport has a commitment to implementing environmentally sustainable practices airport-wide, and continues to make progress on a range of initiatives.

Sustainability Goals

Logan Airport is a complex of interconnected buildings, transportation facilities, utility infrastructure, natural environments, and management systems. The long-range planning, ongoing development, and day-to-day operations can present opportunities to adopt sustainable practices that mirror Massport's environmental goals and demonstrate its leadership within New England and the aviation industry.

In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles.[7]

> *"Massachusetts Port Authority (Massport) is committed to operate all of its facilities in an environmentally sound and responsible manner.*
>
> *Massport will strive to minimize the impact of its operations on the environment through the continuous improvement of its environmental performance and the implementation of pollution prevention measures, both to the extent feasible and practicable in a manner that is consistent with Massport's overall mission and goals."*

In October 2004, Massport prepared the *Massachusetts Port Authority Sustainability Plan* which presents Massport's long-term and short-term goals regarding sustainability. It also identifies the actions necessary to achieve the goals, the staff members responsible for each sustainability goal, and the timeline for achieving the goals. The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision. The short-term goals set out in the Sustainability Plan are described below.

6 http://en.wikipedia.org/wiki/Brundtland_Report - _ref-0 United Nations. 1987. "Report of the World Commission on Environment and Development." General Assembly Resolution 42/187, 11 December 1987.
7 The Environmental Management Policy is on Massport's website at www.massport.com/business/envir_polic.html.

Massport-wide sustainability goals are:

- Develop a policy that states that new development projects obtain certification under the U.S. Green Building Council Leadership in Energy and Environmental Design® (LEED) Green Building Rating System™ and include LEED accredited professionals on the design team. LEED is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings.
- Establish and implement an Alternative Fuel Vehicle Policy (AFV) Policy that requires key personnel to review and consider AFVs when there is a request for a new or replacement vehicle and to select AFVs unless there is a compelling reason not to.
- Increase construction waste recycling and reuse.
- Implement a process to consider environmental impacts when making purchases.

Additional sustainability goals relating specifically to Logan Airport are:

- Establish a recycling program in Airport terminals.
- Retrofit or purchase heavy-duty equipment with diesel oxidation catalysts or particulate filters.

Sustainability is incorporated into many aspects of Massport's activities: planning and design; construction; operations, maintenance and management; and monitoring of environmental performance. Some of the sustainability initiatives undertaken by Massport in these categories are described below. Sustainability initiatives which relate to monitoring environmental performance have been described previously in the Water Quality/Environmental Compliance and Management section of this chapter.

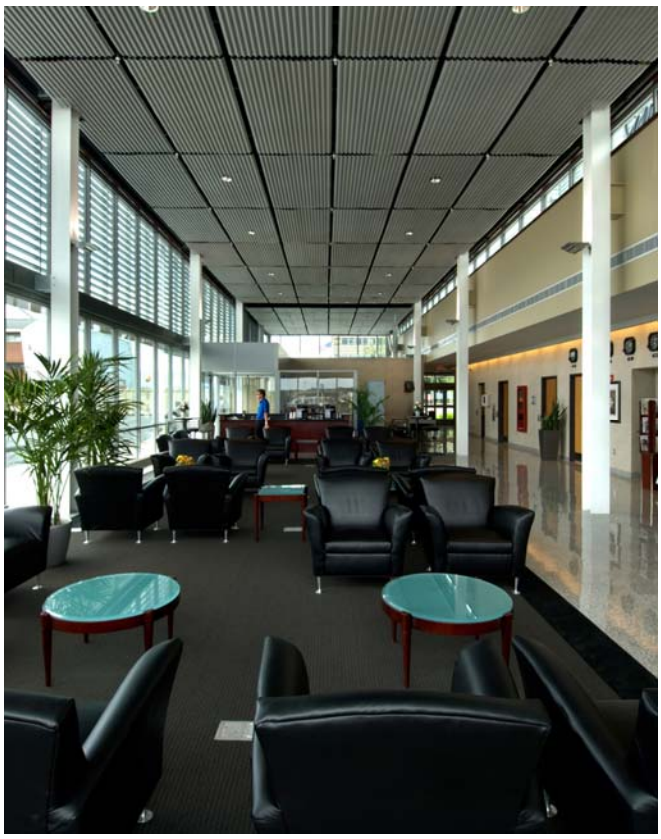
Planning and Design

The replacement GA Facility in the North Cargo Area, which was constructed in early 2007 and opened in June 2007, is another example of planning and design sustainability initiatives being undertaken at Logan Airport. Like the LEED-certified Terminal A, the new GA Facility represents a high-quality architectural design that incorporates sustainable design, construction, and operational elements. Sustainable elements incorporated into the new GA Facility include:

- Maximizing daylight throughout the building and controlling solar gain with high performance glazing systems and vertical and horizontal sunshades.
- Designing and installing a high-energy efficient building envelope, heating, ventilation and air conditioning system (HVAC), water heating, power, and lighting and equipment systems to provide maximum performance with the least of amount of energy usage.
- Using recyclable building materials, Forest Stewardship Council (FSC) certified wood products, and locally and regionally sourced materials throughout.
- Deploying alternatively-fueled GSE.
- Designing a landscaped garden with water-efficient landscaping to reduce water use and solar gain, and to reduce the amount of impervious surfaces within the Airport's hardscape.

In January 2008, Massport and the operator of the GA Facility, Signature Flight Support, submitted an application to the U.S. Green Building Council for certification for the facility under LEED. LEED certification was subsequently awarded in May 2008, making it the first LEED-certified GA facility in the U.S. Logan Airport was also the first airport in the U.S. to have a LEED-certified terminal (Terminal A achieved LEED certification in June 2006). Obtaining LEED certification for the new GA Facility is consistent with Massport's sustainability goals set out in the Sustainability Plan. Views of the facility are provided below.





Views of the LEED-certified GA Facility

Sustainable Construction

Massport is committed to sustainable practices to help reduce impacts associated with construction. For example, Massport requires contractors to comply with construction guidelines regarding demolition waste recycling, soil reuse, and air emissions from construction equipment.

Sustainable Operations and Maintenance

Massport has several programs in place that contribute to the environmentally sustainable operation and maintenance of Logan Airport and its facilities. Massport also encourages its tenants to do the same. These programs include:

- An alternative fuel vehicles (AFV) program for Massport-owned vehicles (refer to *Chapter 7, Air Quality/Emissions Reduction* for details on this program).

- The state's first preferred parking program for customers driving hybrid and AFVs. In 2007, Massport created preferred parking areas in garages and parking areas throughout Logan Aiport to promote use of lower emitting vehicles.



Logan Airport Implements the State's First Preferred Parking Program for Hybrid and Alternatively Fueled Vehicles

- In cooperation with the City of Boston, in the spring of 2007, Massport began a limited head-of-line privilege program for taxis using AFVs, thereby helping to increase the use of alternatively-powered taxis.
- In 2007, Massport created a Cell Phone Waiting Lot, a new parking area where drivers picking up arriving passengers can park for a maximum of 30 minutes. The new lot provides a vehicle waiting area for drivers who would otherwise have circled the Airport or idled at the curb while waiting for arriving passengers. In creating the Cell Phone Waiting Lot, Massport's goal was to reduce unnecessary vehicle circulation on Airport roadways and to reduce the associated emissions of air pollutants.
- Equiping all aircraft contact gates with 400 Hz power and pre-conditioned air (PCA) that reduces the emission of air pollutants.
- Promoting HOV ridership and use of public transportation by employees and passengers. In 2007, the Logan TMA introduced and implemented three new programs to enhance and support employees' use of alternative transportation options (refer to *Chapter 5, Ground Transportation* for details).
- Reduced use of toxic materials and substitution with non-toxic alternatives.





The Cell Phone Waiting Lot Reduces Unnecessary Vehicle Circulation and Emissions of Air Pollutants

- A recycling program in Airport terminals and for construction and demolition debris. Massport implemented a terminal areas recycling program starting with the new Terminal A in 2005, Terminal C in 2006 and Terminals B and E in 2007. The program consists of post-security collection of mixed paper (newspaper, cardboard and magazines), plastics, aluminum, and glass. Massport's administrative building, the Logan Office Center, also participates in this program, recycling mixed paper, plastic, aluminum and glass. In addition, Massport's construction contracts include a requirement for recycling of demolition debris and other materials. A pre-security terminal recycling program was initiated in 2008.
- A program that educates Massport staff on everyday ways to save energy and reduce waste while at work.


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Logan Office Center Recycling

Mixed Paper

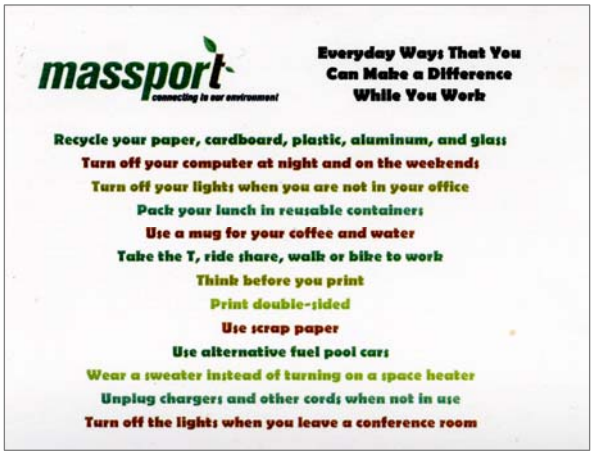
White paper – Colored paper – Stationery – Manila folders – Post-it notes – Tablet sheets – Desk calendars – Adding machine tape – Junk mail – Newspapers – Magazines – Catalogs – Old phone books – Cereal boxes – Corrugated cardboard – Envelopes (without windows) – Hanging folders (metal removed)

Plastic/Aluminum/Glass

Plastic containers numbers 1-7 – Milk containers – Water bottles – Soda bottles – Yogurt containers – Plastic water cups – Soup cans – Soda cans – Clear glass – Brown glass – Green glass

Please rinse out food residues

Logan Office Center Recycling Program


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Everyday Ways That You Can Make a Difference While You Work

Recycle your paper, cardboard, plastic, aluminum, and glass
Turn off your computer at night and on the weekends
Turn off your lights when you are not in your office
Pack your lunch in reusable containers
Use a mug for your coffee and water
Take the T, ride share, walk or bike to work
Think before you print
Print double-sided
Use scrap paper
Use alternative fuel pool cars
Wear a sweater instead of turning on a space heater
Unplug chargers and other cords when not in use
Turn off the lights when you leave a conference room

Massport educates staff on Energy and Waste Reduction

Organization of the *2007 EDR*

The remainder of this *2007 EDR* is organized as follows:

- ***Chapter 2, Activity Levels***, presents aviation activity statistics for Logan Airport in 2007 and compares activity levels to the prior year. The specific activity measures discussed include air passengers, aircraft operations, fleet mix, and cargo/mail volumes.
- ***Chapter 3, Airport Planning***, provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2007. It also describes known future planning, construction, and permitting activities and initiatives.
- ***Chapter 4, Regional Transportation Context***, describes activity levels at New England's regional airports in 2007 and updates recent planning activities.
- ***Chapter 5, Ground Transportation***, reports on transit ridership, roadways, traffic volumes, and parking for 2007.
- ***Chapter 6, Noise Abatement***, updates the status of the noise environment at Logan Airport in *2007*, and describes Massport's efforts to reduce noise levels.
- ***Chapter 7, Air Quality/Emissions Reduction***, provides an overview of airport-related air quality issues in 2007 and efforts to reduce emissions.
- ***Chapter 8, Water Quality/Environmental Compliance and Management***, describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the MCP, and tank management.
- ***Chapter 9, Project Mitigation Tracking***, reports on Massport's progress in meeting its MEPA Section 61 mitigation commitments for specific Airport projects.

Supporting appendices include the following:

- **MEPA Appendices**: The MEPA Secretary's Certificate on the *2006 EDR*, comment letters received on the *2006 EDR* and responses to those comments, Secretary's Certificates on the annual reports issued for reporting years 2004 and 2005, a list of reviewers to which the *2007 EDR* was distributed, and a proposed scope for the *2008 EDR*.
- **Technical Appendices**: These include detailed analytical data and methodological documentation for the various environmental analyses presented in and conducted for this *2007 EDR*.

2
Activity Levels

Introduction

This chapter reports on annual activity for Logan Airport in 2007, including air passengers, aircraft operations, aircraft fleet mix, and cargo and mail volumes. The 2007 levels are compared to 2006 levels; a trends analysis is conducted every five years in the Logan Airport Environmental Status and Planning Reports (ESPRs). The next ESPR will report on 2009 conditions and update activity level forecasts, and will compare historic trends.

The activity levels form the basis for the evaluation of ground transportation, noise, and air quality impacts associated with Logan Airport activities.

Key Findings

In 2007, the U.S. airline industry continued to be in flux due to economic and other factors. Passenger activity levels at Logan Airport in 2007 were up slightly since 2006, while the number of annual aircraft operations continued to decline.

In 2007:

- The total number of air passengers reached 28.1 million, up from 27.7 million in 2006. The increase in the total number of air passengers at Logan Airport was 1.4 percent compared to 2.4 percent in the previous year.
- The total number of aircraft operations declined from 406,119 in 2006 to 399,537, a decrease of 1.6 percent. Operations by general aviation (GA) aircraft decreased most significantly (8.9 percent) as compared to passenger and cargo operations.
- As a result of continued passenger growth and a reduction in operations, the number of air passengers per aircraft operation (load factor) continued to increase. This is in line with national trends.
- Growth by low-cost carriers (LCCs) slowed and legacy airlines reduced their aircraft operations at Logan Airport as a means of dealing with high and rising fuel prices and intense price competition throughout the industry.

- Air cargo volumes, excluding mail, continued to decline from 679 million pounds in 2006 to 632 million pounds with the largest volume decrease occurring in the freight segment.
- The domestic airline industry earned profits in 2007, but faces a challenging operating environment in 2008 if fuel prices continue to rise, and the United States (U.S) and global economies weaken.

Air Passenger Trends

Passenger levels at Logan Airport continued to increase in 2007, reaching 28.1 million and surpassing the previous record high of 27.7 million in 2000. While Logan Airport accommodated more passengers in 2007 than in 2006, the year-to-year growth slowed to 1.4 percent, as compared to 2.4 percent in the prior year (Table 2-1). Passenger growth at Logan Airport was slower than in the U.S. as a whole, which grew by 3.3 percent in 2007. The slowdown at Logan Airport is due to:

- Slower growth by the LCCs at the Airport.
- Capacity cuts and resulting passenger declines for three of Logan Airport's largest carriers (including their regional affiliates) – American Airlines, Delta Air Lines and United Airlines.
- Additional capacity cuts by other airlines in the fourth quarter of 2007 to deal with escalating fuel costs and slower economic growth.
- Higher airfares introduced in 2007 to recoup higher fuel costs.

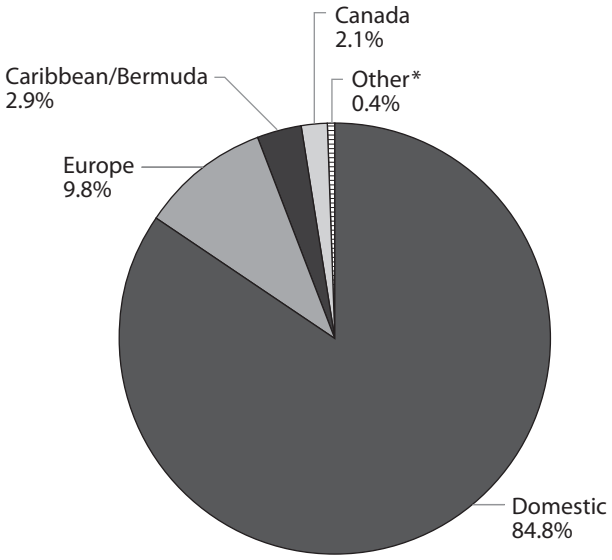
As shown in Table 2-1, domestic passengers, Logan Airport's largest market segment, increased by 1.2 percent and accounted for 84.8 percent of total passengers. Figure 2-1 shows the distribution of Logan Airport passengers by market segment. The average non-stop stage length (length of the average flight) of scheduled domestic flights from Logan Airport continued to increase. In 2007, the average length of domestic flights was 730 miles, compared to an average domestic stage length of 711 miles in 2006.

Table 2-1 Air Passengers by Market Segment[1]

	2004	2005	2006	2007	Percent of Total Passengers in 2007	Percent Change (2006-2007)
Domestic	21,830,294	22,728,788	23,556,382	23,837,727	84.82%	1.19%
International	4,201,638	4,237,105	4,049,595	4,153,442	14.78%	2.56%
Europe/ Middle East	2,590,225	2,629,823	2,599,382	2,754,427	9.80%	5.96%
Canada	622,098	682,904	621,185	581,178	2.07%	(6.44%)
Bermuda/ Caribbean	911,757	845,863	784,477	807,094	2.87%	2.88%
Asia/Pacific[2]	0	0	0	0	0%	--
Central/South America	77,558	78,515	44,551	10,743	0.04%	(75.89%)
General Aviation	110,584	122,012	119,466	111286	0.40%	(6.85%)
Total Passengers	26,142,516	27,087,905	27,725,443	28,102,455	100.00%	1.36%

Source: Massport.
1 Direct flights only.
2 There were no direct flights to Asia/Pacific.

Figure 2-1 Distribution of Logan Airport Passengers by Market Segment (2007)



Source: Massport.
* Other includes General Aviation (GA) operations.

International passenger traffic at Logan Airport increased by 2.6 percent in 2007, compared to a 4.4 percent decrease in 2006. Europe/Middle East was the dominant international destination market, accounting for 9.8 percent of total traffic and 66.3 percent of international traffic. Air traffic to Europe was also the fastest growing segment served from Logan Airport, increasing by nearly 6.0 percent in 2007. The Bermuda/Caribbean market, Logan Airport's second largest region for international passengers, grew by 2.9 percent. Travel to and from Canada continued to decline, falling by 6.4 percent since 2006. Passengers traveling to Central/South America fell by 75.9 percent, but this segment represented less than one-tenth of 1 percent of the total number of annual Airport passengers.

Additional scheduled service to destinations in Europe and the Caribbean contributed to international passenger growth at Logan Airport in 2007. Scheduled weekly international departures during the peak summer travel season (July 2007) were 12.8 percent higher than the previous year.

Aircraft Operations in 2007

The total number of aircraft operations at Logan Airport declined from 406,119 in 2006, to 399,537 operations in 2007, a decrease of 1.6 percent (Table 2-2). Aircraft operations continued to decline despite rising passenger numbers, as airlines adjusted their service frequencies to serve passenger demand more efficiently and economically. As a result, the number of passengers per aircraft operation (load factor or percentage of seats occupied by revenue passengers) increased.

Jet aircraft (with 90 or more seats) activity at Logan Airport was stable in 2007, increasing by just 0.2 percent. A decline in regional jet (RJ) operations, which began in 2006, accelerated in 2007. RJs historically carried a maximum of 35 to 50 passengers and had longer operating ranges than similarly sized turboprops, but newer

models of regional jets carry up to 100 passengers. While these aircraft allowed airlines to make their operations more efficient by adjusting their capacity to suit demand, unit operating costs (the operating cost per seat) are higher than unit operating costs for larger jets. Faced with rising fuel costs and higher unit aircraft operating costs, airlines have scaled back their RJ operations. This trend was evident at Logan Airport in 2007, with RJ operations declining by 11.7 percent compared to 2006.

Operations by non-jet aircraft (turboprop or piston aircraft) increased by 10.8 percent in 2007, after several years of steady declines. The increase mainly reflects the introduction of new scheduled service by Delta Air Lines, through its code share partner Big Sky Airlines, to several small markets in the Northeast. Other carriers added non-jets to supplement scheduled service or replace RJ service in certain short-haul markets. Despite this growth, non-jet operations, which accounted for more than 50 percent of total scheduled flights in the early 1990s, represented just 15 percent of Logan Airport's scheduled operations in 2007. The change in the mix of scheduled passenger flights at Logan Airport over the last four years is shown in Figure 2-2.

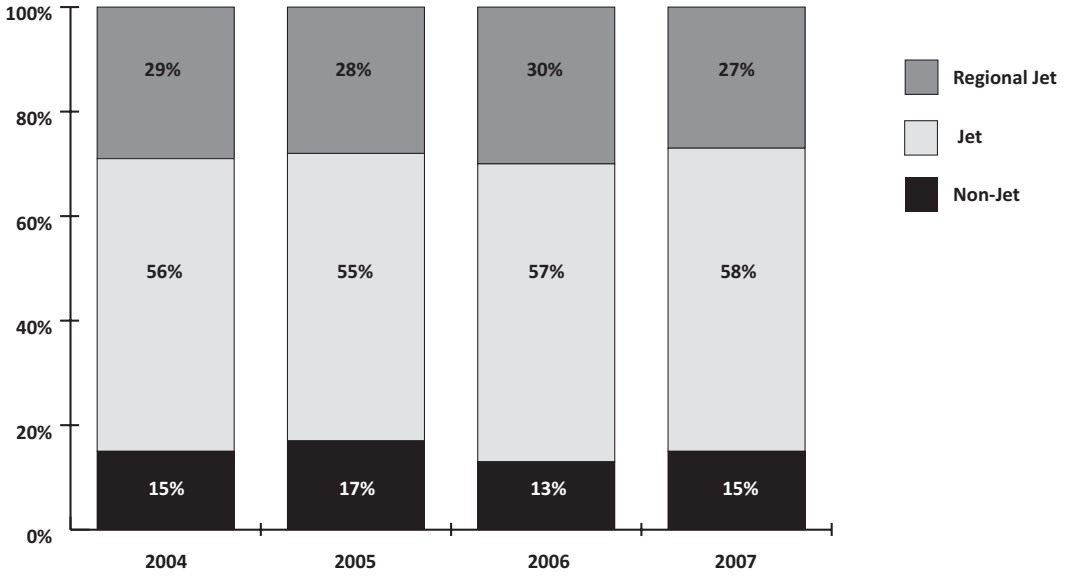
The average number of seats per scheduled passenger flight from Logan Airport was 101 in 2007, up from 98 in 2006 and a low of 87 in 1993. Since 2002, the average number of seats per flight at Logan Airport has been higher than the national average. In 2007, the national average aircraft size was 96 seats, compared to 101 at Logan Airport. The average size of an RJ departing Logan Airport was 57 seats in 2007, up from 55 in 2006. This increase reflects the introduction of larger 66 to 100-seat RJs by JetBlue Airways, United Airlines, and US Airways.

Table 2-2 Logan Airport Aircraft Operations

Category	2004	2005	2006	2007	Percent of Total (2007)	Percent Change (2006-2007)
Operations by Aircraft Class						
Jet	245,397	236,221	241,526	242,030	60.6%	0.21%
Regional Jet	102,039	113,886	110,554	97,614	24.4%	(11.70%)
Non-Jet	57,823	58,960	54,039	59,893	15.0%	10.83%
Total Operations	405,259	409,067	406,119	399,537	100.0%	(1.62%)
Operations by Type and Aircraft Class						
Passenger Jet	212,723	201,502	206,467	211,021	52.8%	2.21%
Passenger Regional Jet	102,039	113,886	110,554	97,614	24.4%	(11.70%)
Passenger Non-Jet	49,672	52,114	48,663	53,663	13.4%	10.27%
Total Passenger Operations	364,434	367,502	365,684	362,298	90.7%	(0.93%)
GA Jet Operations	23,085	25,806	26,566	22,925	5.7%	(13.71%)
GA Non-Jet Operations	8,151	6,846	4,878	5,707	1.4%	16.99%
Total GA Operations	31,236	32,652	31,444	28,632	7.2%	(8.94%)
Cargo Jet	9,589	8,913	8,493	8,084	2.0%	(4.82%)
Cargo Non-Jet	0	0	498	523	0.1%	5.02%
Total Cargo Operations	9,589	8,913	8,991	8,607	2.2%	(4.27%)

Source: Massport.

Figure 2-2 Mix of Scheduled Passenger Aircraft Operations at Logan Airport by Aircraft Class



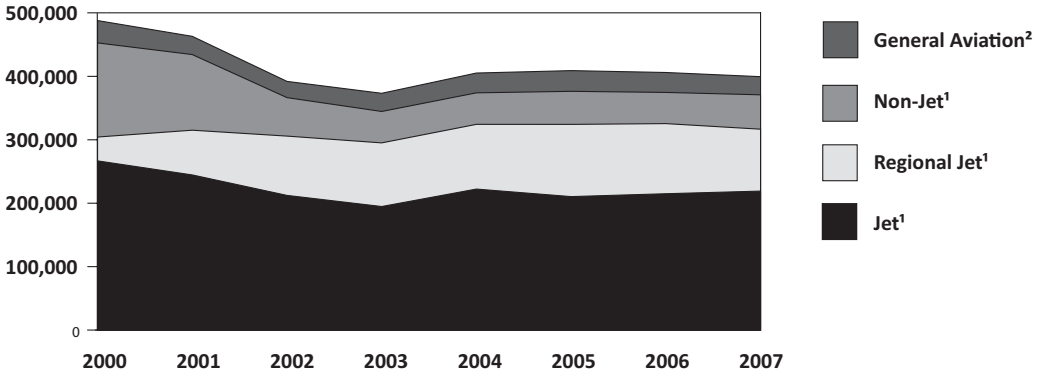
Source: Official Airline Guide, (August 2004 through August 2007).
Note: All totals based on scheduled August departures. Percentages may not add due to rounding.

Delta Air Lines, US Airways, American Airlines, JetBlue Airways, and Cape Air were the largest carriers at Logan Airport in 2007 based on aircraft operations.[1] Delta Air Lines and its affiliates accounted for 72,500 operations compared to 68,900 for US Airways, which ranked second. American Airlines retained its number three ranking with 55,200 operations despite a substantial decline in activity by its American Eagle affiliate. JetBlue Airways, which had 36,300 operations at Logan Airport in 2007, and Cape Air, which accounted for 26,500 operations, ranked 4th and 5th, respectively.

Operations by GA aircraft decreased by 8.9 percent and all-cargo operations fell 4.3 percent from 2006 levels. Together, GA and cargo operations represent less than 10 percent of total aircraft operations at Logan Airport. Figure 2-3 depicts the changes in Logan Airport aircraft operations since 2000.

1 Airline rank is based on total number of operations for carrier "families," including activity for all code share partners and regional subsidiaries.

Figure 2-3 Aircraft Operations at Logan Airport by Aircraft Class



Source: Massport.
1 Jet, regional jet, and non-jet ncludes commercial airlines.
2 General Aviation operations include jet and non-jet aircraft and includes private corporate and on-demand charters.

Passengers and Operations Trends in 2007

Air carriers showed further gains in operational efficiency in 2007 as the average number of passengers per aircraft operation continued to increase. In 2007, Logan Airport operations accommodated an average of 70.3 passengers per flight compared to 68.3 passengers in 2006 (Table 2-3). The average number of passengers per flight has risen by 7.3 percent since 2004. This is a reflection of the airlines' continued emphasis on capacity rationalization and strong underlying demand for air travel. The load factor for flights from Logan Airport has historically been below the national average, but like the national average, it has been increasing. These load factor trends continued in 2007. Last year, the average domestic load factor for flights at Logan Airport was 74.9 percent, up from 72.6 percent in 2006 but lower than the national average of 80 percent.

Table 2-3 Air Passengers and Aircraft Operations

Year	Air Passengers	Percent Change	Aircraft Operations	Average Passengers per Operation	Net Change From Previous Year
2004	26,142,516	14.70%	405,258	64.5	3.4
2005	27,087,905	3.62%	409,066	66.2	1.7
2006	27,725,443	2.35%	406,119	68.3	2.1
2007	28,102,455	1.36%	399,537	70.3	2.1

Source: Massport.

Airline Passenger Service in 2007

In 2007, over 50 airlines provided scheduled or charter passenger service from Logan Airport to more than 120 nonstop destinations. This section describes the major changes in Logan Airport's scheduled passenger services in 2007.

Changes in Domestic Passenger Service

As shown in Table 2-4, total domestic flights at Logan Airport declined by 2 percent in 2007. Domestic jet flights were relatively unchanged (0.1 percent) from the prior year, but the number of regional/commuter flights fell by 4.8 percent.

Services by LCCs operations at Logan Airport declined by 3.8 percent in 2007. JetBlue Airways, the largest LCC at Logan Airport, continued its expansion, increasing operations by 9.2 percent from 31,993 operations in 2006 to 34,933 operations in 2007. Spirit Airlines also grew at Logan Airport, increasing its operations by 163 percent from 683 flights in 2006 to 1,796 in 2007. However, growth by JetBlue Airways and Spirit Airlines was offset by reduced activity from AirTran Airways and Song Airways. AirTran Airways decreased its operations at Logan Airport by 5.5 percent in 2007, and Delta Air Lines incorporated Song Airways, an operating unit created to compete with the LCCs, into its mainline operations in 2006. Song Airways was designed by Delta Air Lines to compete with the LCCs by offering low-fares and a similar level of service, but it did not have the same low-cost structure as the LCCs, which ultimately contributed to its demise.

Table 2-4 Domestic Air Passengers by Airline Category

Category	2004	2005	2006	2007	Change 2006-2007	Percent Change
Total Jet Operations	193,599	190,991	199,281	198,879	281	0.14%
Legacy/Charter Carriers	146,411	137,422	141,704	143,465	1,761	1.24%
Low Cost Carriers	47,188	53,569	57,577	55,414	-2,163	(3.76%)
Regional/Commuter	130,272	137,203	130,298	124,014	-6,284	(4.82%)
Charter Carriers	423	325	369	570	201	54.47%
Total Domestic	324,294	328,519	329,948	323,463	-6,485	(1.97%)

Source: Massport.
Note: LCCs for 2007 include AirTran Airways, JetBlue Airways, and Spirit Airlines. America West, which was merged with US Airways in September 2005, is not included as a LCC in 2006 or 2007 because the combined entity had operating costs that were significantly higher than those of the low-cost carriers.

Changes in Domestic Markets Served

Four new nonstop domestic markets were served from Logan Airport in 2007:

- Delta Air Lines began RJ service to Louisville International Airport with one daily departure.
- Delta Air Lines commenced nonstop services to Plattsburgh International Airport (New York). This service was operated by Delta Air Lines' code share partner, Big Sky Airlines, with non-jet aircraft.
- Alaska Airlines commenced nonstop service to Portland International Airport (Oregon) operating one daily departure.
- Delta Air Lines' partner, Big Sky Airlines, added new nonstop service to Watertown Airport (New York) with non-jet aircraft.

The major domestic service reductions at Logan Airport that led to slower passenger growth in 2007 compared to the previous year, included the following:

- AirTran Airways discontinued services to Fort Lauderdale in June 2007 and eliminated services to Chicago Midway International Airport and Philadelphia International Airport in November 2007, after reducing frequencies in these markets earlier in the year.
- American Eagle discontinued services to Baltimore/Washington International Thurgood Marshall Airport in December 2006, Newark Liberty International Airport, and Lambert-St. Louis International Airport in April 2007, and Bangor International Airport in November 2007. American Eagle also reduced scheduled frequencies in the Columbus, Raleigh/Durham and Washington National markets.
- In 2006, Delta Air Lines eliminated its low-fare Song Airways services to Florida, McCarran International Airport in Las Vegas, and Los Angeles International Airport. While Delta Air Lines continued to serve these markets with its mainline product in 2007, it did so with less frequency and smaller capacity aircraft.
- United Airlines trimmed frequencies in most of its nonstop domestic markets at Logan Airport, flying fewer daily departures to Denver International Airport, Los Angeles International Airport, and Washington Dulles International Airport.

A complete listing of all changes in scheduled departures by domestic destination is in *Appendix E, Activity Levels*.

Changes in International Passenger Service

Total international passenger operations grew 8.7 percent in 2007, as summarized in Table 2-5. (For details on the changes in operations by carrier, see *Appendix E, Activity Levels*.) All but one market segment (the Central/South American market) for scheduled operations experienced growth in 2007. The Canadian market, Logan Airport's largest destination region in terms of aircraft operations, increased by 11.6 percent. The Europe/Middle East market, the second largest international market in terms of operations and the largest in passengers, experienced a 9.8 percent increase in aircraft operations. The Bermuda/Caribbean market grew by 8.4 percent. The Central/South American market, the smallest with only 131 operations, was the only region with a decline in scheduled aircraft operations.

Changes in International Markets Served during 2007

The increase in international aircraft operations in 2007 reflects the addition of several new year-round and seasonal services at Logan Airport.

- Iberia Airlines introduced new nonstop service to Madrid.
- Flyglobespan began seasonal service to Ireland and Scotland.
- Aer Lingus added nonstop service to Dublin.
- Northwest Airlines added a second daily flight to Amsterdam.
- Icelandair added a second daily flight to Reykjavik during the peak season.
- British Airways added frequencies to London Heathrow during off-peak months.

- Finnair added one weekly flight to its Boston-Stockholm schedule.
- JetBlue Airways began new services to Bermuda and several Caribbean destinations (Aruba, Bermuda, Cancun, and Santiago, Dominican Republic).
- Delta Air Lines' partner, Big Sky Airlines, added non-jet services to Fredericton and Quebec City in Canada.

Several service reductions led to the decline in aircraft operations in the Central/South America and Bermuda/Caribbean markets.

- Aeromexico discontinued scheduled services between Logan Airport and Mexico City.
- Cayman Airways eliminated service to Grand Cayman.
- TACA International discontinued service to San Salvador.

Table 2-5 International Passenger Operations by Market Segment

Category	2004	2005	2006	2007	Percent Change (2006-2007)	Average Annual Growth (2004-2007)
Scheduled	38,588	37,575	35,003	38,308	9.44%	(0.24%)
Europe/Middle East	12,085	12,206	11,954	13,127	9.81%	2.80%
Canada	18,639	18,914	16,893	18,859	11.64%	0.39%
Bermuda/Caribbean[1]	6,838	5,594	5,710	6,191	8.42%	(3.26%)
Central/South America	1,026	861	446	131	(70.63%)	(49.65%)
Non-Scheduled	1,467	1,068	727	527	(27.51%)	(28.91%)
Total	40,055	38,643	35,730	38,835	8.69%	(1.03%)

Source: Massport.
1 Includes Puerto Rico and U. S. Virgin Islands.

2007 Cargo Activity Levels

In 2007, Logan Airport ranked 21st among U.S. airports in total cargo volume.[2] Cargo at Logan Airport is carried in the belly compartments of passenger aircraft or by dedicated all-cargo carriers, such as Federal Express, United Parcel Service, and DHL Airways in all-cargo aircraft. The express/small package segment dominates Logan Airport cargo activity, accounting for 63.7 percent of the total non-mail cargo volume. Table 2-6 shows all-cargo aircraft operations and cargo volumes at Logan Airport since 2004. In 2007, Logan Airport handled fewer all-cargo operations and cargo shipments than in 2006.

Cargo shipments (all shipments including express and non-express mail and packages) at Logan Airport have been declining for several years and that trend continued in 2007. Total cargo volume, including mail, fell by 8.1 percent in 2007 (Table 2-6). Mail, which accounts for just 3.9 percent of total volume, experienced the steepest decline. The declines in cargo activity at Logan Airport are consistent with national trends as cargo carriers,

2 Airports Council International, Final 2007 Air Traffic Report.

particularly the freight integrators, which provide door-to-door delivery services, and the U.S. Postal Service, continue to move more shipments by truck because it is more cost-effective than air.
Federal Express carried 44.2 percent of the total volume of air cargo through Logan Airport in 2007 and was the 12th largest carrier at the Airport in terms of total flights. United Parcel Service carried an additional 12.9 percent of Logan Airport's total cargo volume in 2007. Passenger airlines carried 36.2 percent, or 238 million pounds, of cargo as belly cargo in 2007.

Table 2-6 Cargo and Mail Operations and Volume

	2004	2005	2006	2007	Percent Change (2006-2007)	Average Annual Growth (2004-2007)
All-Cargo Aircraft Operations	9,589	8,913	8,991	8,607	(4.27%)	(3.54%)
Volume (lbs.)						
Express/Small Packages	478,584,154	472,605,966	422,173,699	403,051,494	(4.53%)	(5.56%)
Freight	280,690,836	268,911,342	256,894,390	229,398,281	(10.70%)	(6.51%)
Mail	48,412,006	43,728,414	37,269,744	25,843,366	(30.66%)	(18.88%)
Total	807,686,996	785,245,722	716,337,833	658,293,141	(8.10%)	(6.59%)

Source: Massport.
NA Not available.

Airline Industry Trends

State of the Airline Industry in 2007

After suffering consecutive annual losses from 2001 to 2005, the U.S. airline industry returned to profitability in 2006 and this positive trend continued in 2007. Despite rising fuel costs and intense price competition, the largest of the U.S. major airlines[3] had a combined operating income of $6.8 billion for the 12 months ending September 30, 2007. Two major airlines emerged from Chapter 11 bankruptcy protection: Delta Air Lines on April 30, 2007 and Northwest Airlines on May 31, 2007.

3 AirTran, Alaska, American, Continental, Delta, Frontier, JetBlue, Northwest, Southwest, United Airlines, and US Airways.

Figure 2-4 shows the operating profits of a group of major U.S. carriers in 2007. All of the carriers, except for Frontier Airlines and Alaska Airlines, earned an operating profit. While these figures are impressive given the recent history of the industry, the industry remains extremely competitive. With low operating margins, airline profits are highly sensitive to even small changes in fuel costs, average fares, and passenger demand.

In 2007, U.S. air carriers focused on increasing service to international markets, where profit margins are higher than in domestic markets. U.S. air carriers only slightly increased domestic capacity. They were also successful in slightly increasing their average yield by 1.7 percent from 12.72¢ in 2006 to 12.74¢ in the third quarter of 2007. Yield is a measure of unit revenue, calculated as passenger revenue divided by revenue passenger miles (RPMs). RPMs equal revenue passengers carried multiplied by miles flown. Strong economic growth through the third quarter of 2007 sustained passenger demand and contributed to further increases in passenger load factors. All of these trends contributed to the industry's profitability in 2007, in spite of the rising cost of jet fuel, which increased by nearly 10 percent over 2006.

While Logan Airport reached a record high passenger level of 28.1 million in 2007, the rate of growth slowed from 2.4 percent in 2006 to 1.4 percent in 2007. The rate of passenger growth at Logan Airport in 2007 was slower than the overall U.S. industry, which grew by 3.3 percent.[4]

In 2007, the major LCCs (Southwest Airlines, JetBlue Airways, and AirTran Airways) lowered their rate of capacity growth by delaying new aircraft deliveries and selling older aircraft. The major LCCs increased their capacity, measured by available seat miles, by 10.1 percent in 2007 compared to a 12.7 percent increase in capacity a year earlier. JetBlue Airways, the dominant LCC at Logan Airport, reduced its system-wide capacity growth from 20 percent in 2006 to 12.5 percent in 2007. The legacy carriers also restrained their domestic capacity growth in 2007. These moves combined with strong demand throughout most of 2007 allowed LCCs to raise fares to cope with rising fuel prices, which in turn allowed legacy carriers to also raise fares.

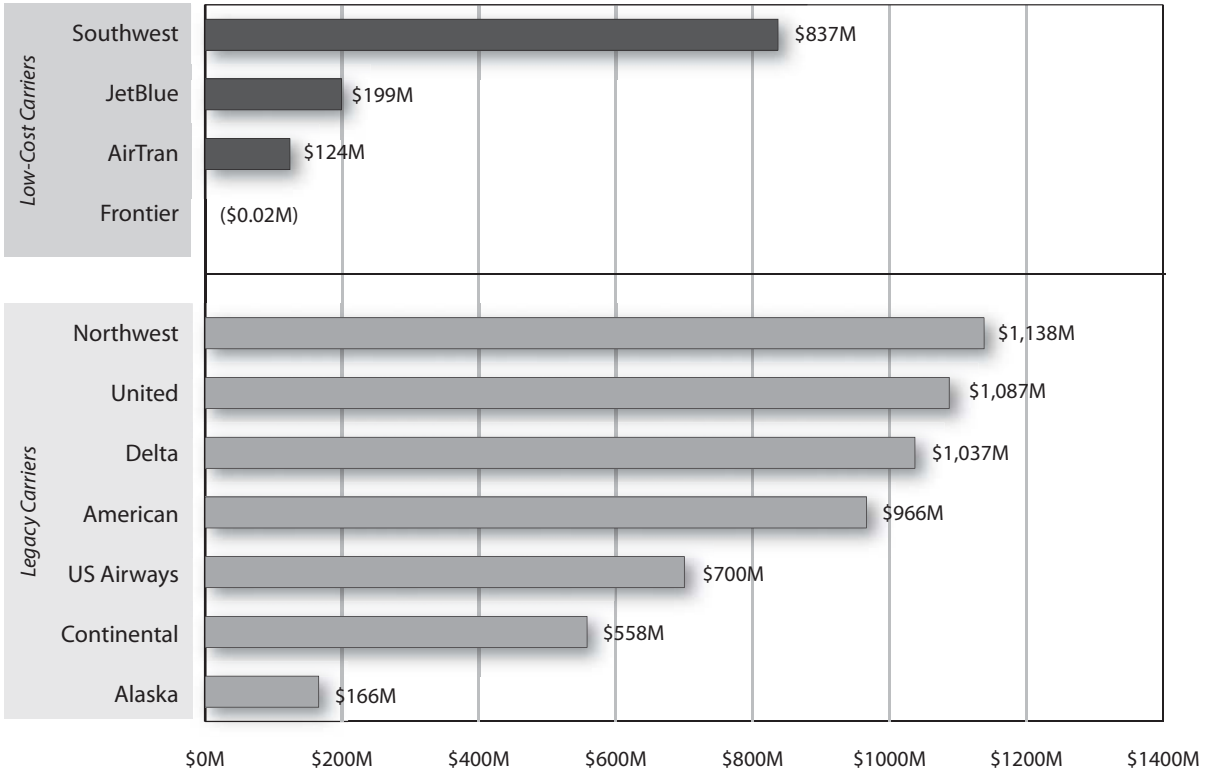
These industry-wide trends were also evident at Logan Airport in 2007. The LCCs, JetBlue Airways, AirTran Airways, and Spirit Airlines, increased their Logan Airport operations by 7.1 percent in 2007, versus a growth of 78.7 percent in 2006. The reduced rate of growth at Logan Airport reflects not only overall LCC strategies to slow system-wide growth in 2007, but also reflects the completion of JetBlue Airways' Terminal C expansion. The carrier signed an agreement with Massport in January 2005 to take over 11 gates and 28 ticket counter positions in Terminal C by November 1, 2008, and to invest more than $9 million in the refurbishment and upgrade of its new terminal facilities. Last year, JetBlue Airways assumed control of its 8th and 9th gates and will assume the final two gates in 2008. Despite a slowdown in LCC growth, Logan Airport offered more than twice as much daily LCC seat capacity as T.F. Green Airport in Warwick, Rhode Island (RI) and nearly 2.5 times Manchester-Boston Regional Airport's capacity.

While the LCCs grew more slowly, the legacy carriers reduced their capacity at Logan Airport in 2007. Total aircraft operations by legacy carriers (excluding all-cargo and charter operators) fell by 2.3 percent last year, largely as a result of service reductions by American Airlines, Delta Air Lines, and United Airlines. The decline in legacy carrier operations at Logan Airport in 2007 reflected airline operating strategies to trim unprofitable flights, restrain capacity growth, and increase unit revenues to remain profitable in a challenging operating environment characterized by rising fuel costs and intense competition.

4 Based on the Air Transport Association's preliminary 2007 system-wide passenger estimate.

At the end of 2007, airlines were facing a weakening economy as U.S. gross domestic product (GDP) growth slowed to 0.6 percent in the 4th quarter, compared to 4.9 percent in the 3rd quarter. Tightening credit markets and falling housing prices stemming from the subprime mortgage crisis, along with rapidly rising oil prices and reduced consumer spending, indicated that the economy may be headed for a recession in 2008.

Figure 2-4 U.S. Carrier Operating Profits/Losses in Millions of Dollars, Third Quarter, 2007

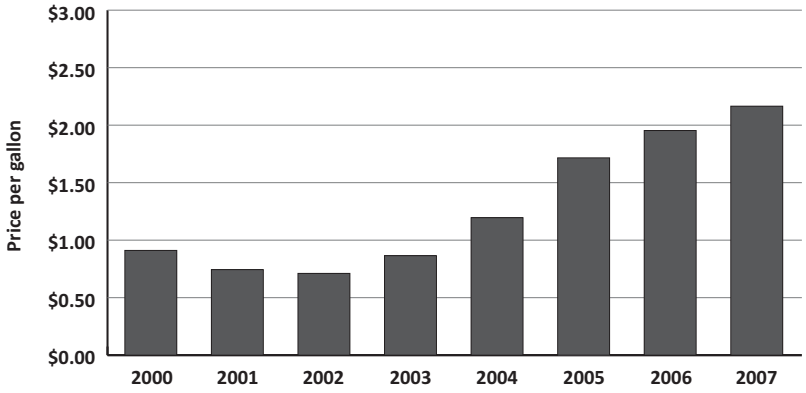


Source: U.S. DOT, Form 41 Airline Reports.

Slower economic growth or a recession coupled with rapidly escalating fuel prices will likely make 2008 another challenging year for the U.S. aviation industry. Airlines are expected to deal with the downturn in the economy by further slowing or reducing capacity growth, streamlining costs where possible, and increasing revenue sources. One means of increasing revenues is to unbundle services and charge passengers for extras, such as an additional fee to check a second bag or an additional fee for a seat with more leg room. This trend of unbundling services is expected to continue in 2008.

Airlines are particularly sensitive to changes in fuel costs. Because U.S. airlines use nearly 20 billion gallons of jet fuel per year, a $0.01 increase in the price of jet fuel can reduce profits by $200 million. Figure 2-5 shows the escalation in price jet fuel over recent years and the upward trend is expected to continue in 2008. The average price of jet fuel in the first quarter of 2008 was nearly 34 percent higher than the average price for 2007. If the economy does enter a recession in 2008 and passenger demand weakens, airlines may not be able to recoup the increased cost of fuel through higher ticket prices, as they did in 2007.

Figure 2-5 New York Harbor Jet Fuel Spot Price

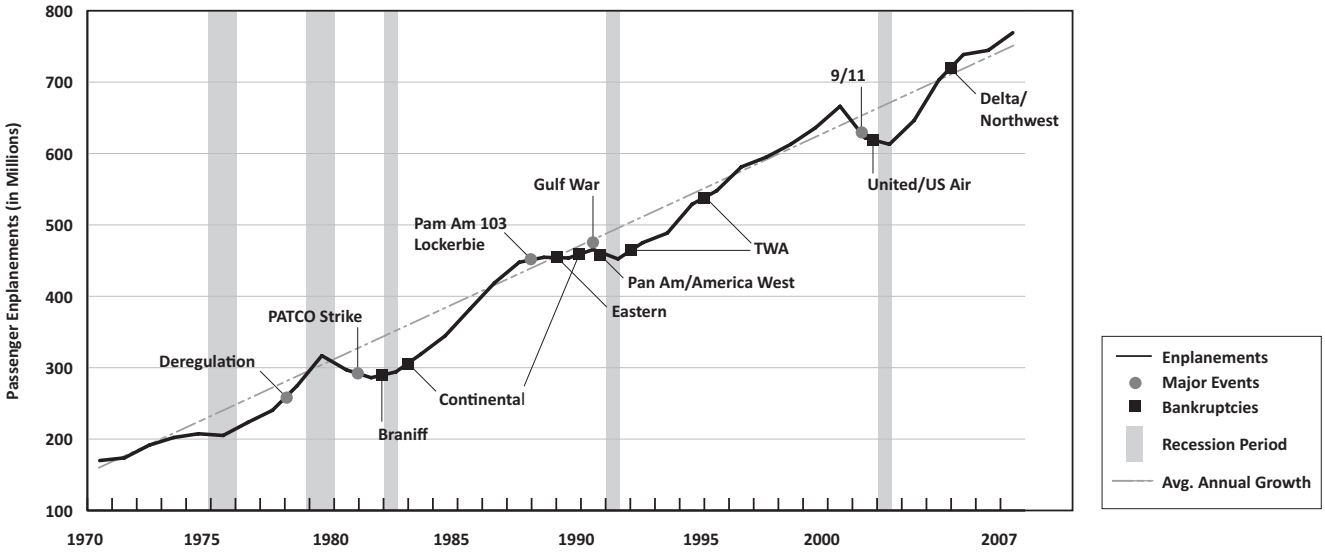


Source: Energy Information Administration.

Intense price competition, excess capacity, higher oil prices (exceeding $100 per barrel), and a weakening economy could lead to major consolidation within the U.S. airline industry in 2008. On April 14, 2008, Delta Air Lines and Northwest Airlines announced an agreement to merge operations, which would create the world's largest airline. In the wake of the Delta Air Lines/Northwest Airlines announcement, additional announcements of mergers between major U.S. airlines are possible. All merger agreements are subject to approval by the U.S. Department of Justice. In addition to potential mergers, several smaller airlines declared bankruptcy and most ceased operations early in 2008.

While 2008 may prove to be another difficult year for the U.S. aviation industry, airlines have dealt with frequent economic and political shocks over the past decades (Figure 2-6). The airline industry is cyclical - affected by both economic and political events. Airline passenger traffic normally declines during an economic recession with passenger growth resuming during subsequent economic expansions. The industry is also sensitive to political and other economic events that may coincide with economic downturns. For example, an economic recession, the Gulf War, and several airline liquidations and reorganizations had a negative impact on industry traffic in 1990/91. Also, the events of September 11, 2001, which directly involved aviation, resulted in an unprecedented decline in air passenger travel and changed the airline environment significantly. In both cases, the industry recovered and passenger growth resumed.

Figure 2-6 Recessions and Industry Bankruptcies (Passenger Enplanements)



Source: Air Transport Association.

If a major airline industry consolidation were to occur, Logan Airport is not expected to experience long-term negative effects as a result. Logan Airport's high percentage of local origin-destination traffic insulates it from many of the negative impacts that connecting hub markets may experience as the result of a merger and hub rationalization. As with past industry mergers, Logan Airport may experience short-term service disruptions as networks are merged, but over the long term, services at Logan Airport are expected to be restored either through increased services by the combined entities or other incumbent airlines and new entrants.

3
Airport Planning

Introduction

This chapter provides a status report on projects completed at Logan Airport in 2007, and outlines plans for future projects and planning concepts that are under consideration by Massport or its tenants through 2020. A discussion of planning for commercial parking at Logan Airport is also presented at the end of this chapter.

As discussed in *Chapter 1, Introduction/Executive Summary* of this *2007 Environmental Data Report (2007 EDR)*, any proposed project that triggers a threshold under the Massachusetts Environmental Policy Act (MEPA) or the National Environmental Policy Act (NEPA) will undergo the appropriate project-specific state and/or federal environmental review.

2007 Planning Highlights

In 2007:

- International Gateway Project (Terminal E) Phase 2 was completed. The Federal Inspection Services (FIS) facility was enlarged and the new arrivals level was constructed, with the other Phase 2 improvements (improvement of the meeter/greeter lobby and the ticketing area) having already been completed. A future phase, involving the construction of a new West Concourse with three new gates for wide-body aircraft is planned for completion after 2010.
- The replacement General Aviation (GA) Facility in the North Cargo Area was completed. The new GA Facility officially opened in June 2007 and is operated by Signature Flight Support. In May 2008, the facility was certified under the U.S. Green Building Council Leadership in Energy and Environmental Design® (LEED) Green Building Rating System™ which is a voluntary, consensus-based national standard for developing high-performance, sustainable buildings. The facility represents a high quality architectural design that is based on sustainable design, construction, and operational principles.
- The southwest corner of Taxiway D was realigned.

- The Terminal Area Roadway Landscaping project was completed. Approximately 6 acres of land between the roadways and terminal areas have been landscaped, including land adjacent to the egress roadway (between the West Garage, Terminal E parking, the Central Cooling and Heating Plant, and the Citgo Station).
- Significant portions of Bremen Street Park were completed in early 2007, and the opening occurred on June 1. Final construction of the park will be completed in 2008.
- Phase II of the West Garage Project was completed. Phase II added three levels of parking (2,800 parking spaces) to the Central Garage.





The LEED-certified GA Facility operated by Signature Flight Support



The Terminal Area Roadway Landscape was completed in 2007

Table 3-1 provides a summary of the status of each project and planning concept, as of December 31, 2007. Descriptions are provided in subsequent sections of this chapter.

Table 3-1 Logan Airport Projects and Planning Concepts 2007

Description	Status	Completion By 2010	Completion By 2020
Terminal Area Projects/ Planning Concepts			
International Gateway Project (Terminal E)			
Phase 1	C		
Phase 2	C		
Future Phase	M/H		✓
Massport Satellite FIS Facility Project	H		
American Airlines Terminal B, Pier A Improvements Project	H		
Terminal B Walkway Extension	H		
Service Area Projects/ Planning Concepts			
Robie Parcel Development/Cargo Facility in the NCA	M/E		✓
Relocated CNG Station in the NCA	E		✓
Consolidated Maintenance Facilities in the NCA	U	✓	
Replacement General Aviation Facility in the NCA	D	✓	
Replacement Cargo Facilities in the NCA	E		✓
Replacement American Airlines Hangar in the NCA	H		✓
Replacement Hangar Facilities in the NCA	H		✓
Renovation Gas Station Facility in the NCA	U	✓	
Flight Kitchen Consolidation in the NSA	D	✓	
New/Replacement GSE Consolidated Facility in the NCA	E		✓
Southwest Service Area Redevelopment Program (Consolidated Car Rental Facility/Commercial Parking)	R		✓
Airside Area Projects/ Planning Concepts			
Runways 22R and 33L Runway Safety Area Enhancements	E	✓	
Security Wall	U	✓	
Logan Airside Improvements Planning Project	M	✓	
Runway 14-32	C		
Taxiway Improvements	C/D	✓	
Centerfield taxiway	U	✓	
Governors Island Aircraft Parking	E		✓
Buffer Projects/ Planning Concepts			
SWSA Buffer	C (Phase 1)/ R (Phase 2)[1]		✓
NSA Buffer	H	✓	
Bremen Street Park	C		
Airport-Wide Projects/ Planning Concepts			
Logan Airport Landscaping	C		
Logan Airport Wayfinding System	U	✓	
Commercial Parking Projects/ Planning Concepts			
West Garage Project - Phase II	C		
NSA Economy Parking Consolidation	H	✓	

Notes: Anticipated completion dates and status as of December 31, 2007.
Details of each project or planning concept are provided in the sections that follow.

E – Planning concepts undergoing evaluation and/or feasibility analysis
M – MEPA Permitting complete (if required)
H – Project or planning concept on hold
R – Project undergoing MEPA, Federal Aviation Administration (FAA), or other review
U – Project under construction
D – Project in design
C – Completed prior to or during 2007
1 – Phase 2 was included as part of the Southwest Service Area Redevelopment Program Draft Environmental Impact Report/Environmental Assessment (DEIR/EA)

Terminal Area Projects/Planning Concepts

The terminal area accommodates most of the passenger functions at Logan Airport including the passenger terminals, terminal area roadways, central parking facilities, and the Hilton Hotel. Table 3-2 presents information on the status of each ongoing terminal area project. In addition, both Massport and its tenants at Logan Airport are proposing projects or exploring planning concepts to modernize and carry out future improvements to the existing terminal facilities. These potential future planning concepts are also detailed in Table 3-2. The location of the ongoing terminal area projects and the planning concepts that may potentially be constructed in the future are shown on Figure 3-1.

Figure 3-1 Location of Projects/Planning Concepts in the Terminal Area

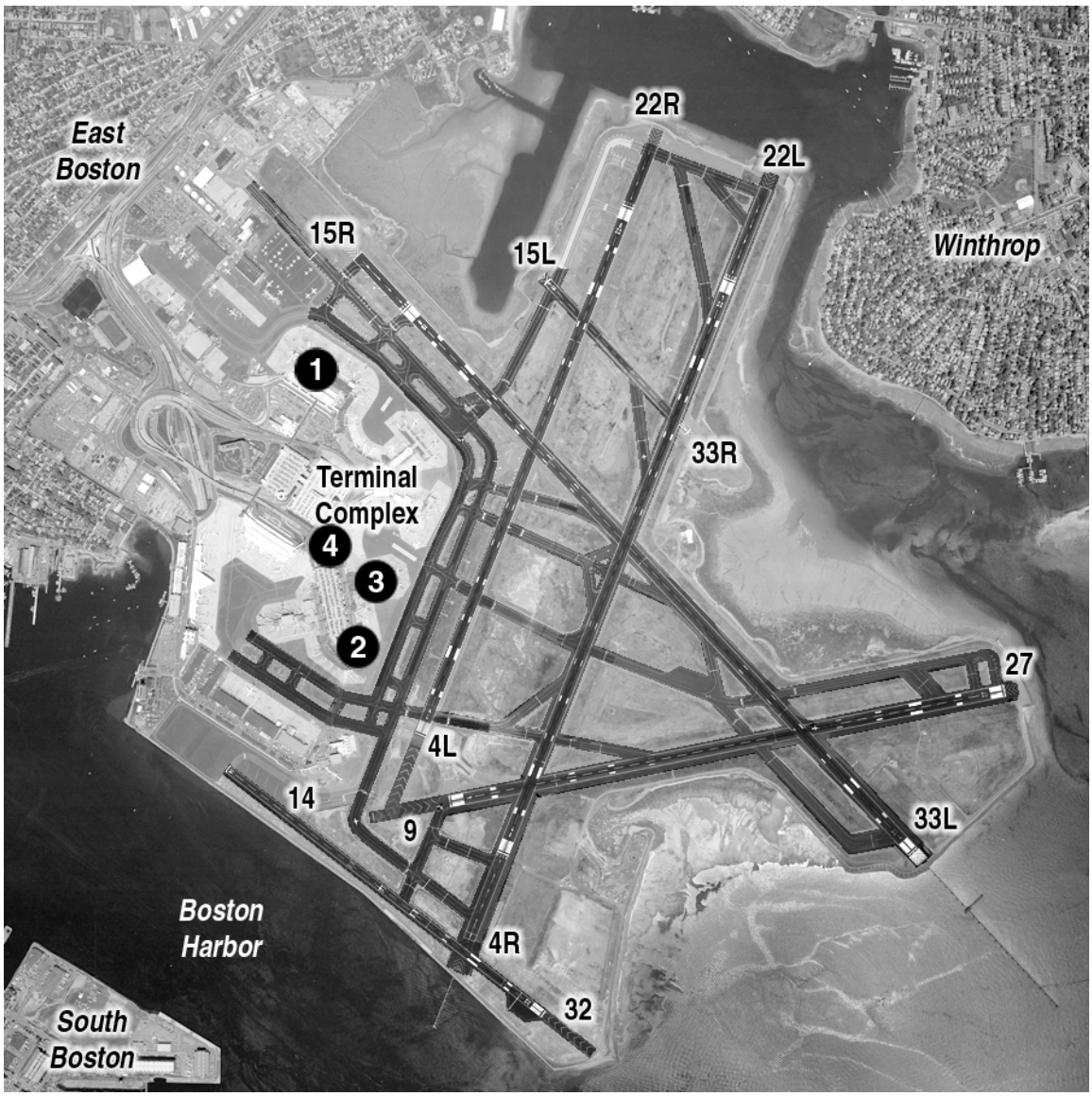


Table 3-2 Description and Status of Projects/Planning Concepts in the Terminal Area (as of December 31, 2007)

Description	Status
Massport Projects/Planning Concepts	
1. International Gateway Project (Terminal E) The International Gateway Project expands and upgrades Terminal E to provide better service to international passengers. This project is being constructed in phases:	
Phase 1 –This phase of the project included a weather-protected outside airside bus portico with an elevator and escalator linking the ground floor with the second floor to accommodate passengers arriving from remotely parked aircraft that are unable to park at a gate because it is occupied by another aircraft.	Construction of the International Gateway Project commenced in the summer of 1998. Phase 1 was completed in 2004.
Phase 2 – This phase of the project enlarges Logan Airport's congested Federal Inspection Services (FIS) Facility, and improves the meeter/greeter lobby and the ticketing area of Terminal E to maximize passenger convenience and reduce processing times in the terminal. The project reconstructs and expands Terminal E in and around the existing terminal while keeping it operational and safe.	The departure level of the new $321 million terminal, including the new ticketing hall and departure level roadway, opened in May 2003. Construction of the new arrivals level continued and was completed in 2007. Other internal construction activities included new restrooms, additional security check points and tenant fit up. The new departure hall includes high ceilings, wood paneling, built-in artwork, and views of the city skyline. Additionally, to reduce curb and roadway congestion at Terminal E, this project also includes a new separated roadway system for arrivals and departures. Construction of the FIS Facility improvements was completed in July 2007.
Future Phase – This phase involves the construction of a new West Concourse, which will add three new gates to Terminal E to accommodate wide body aircraft.	Initial work on the Future Phase (new West Concourse) was completed as part of an airport-wide in-line baggage screening project in 2004. Completion of this phase is anticipated after 2010.
2. Massport Satellite FIS Facility Improvements Project To accommodate more efficiently the potential growth of the international market, Massport proposed to construct a new satellite FIS Facility at the southeast end of Terminal B, Pier A.	Massport and American Airlines filed a joint Environmental Notification Form (ENF) on May 31, 2000 (EOEA #12235), a DEIR on May 9, 2001, and a FEIR on June 23, 2001. On August 24, 2000, the FAA determined that the projects are categorically excluded from the need to prepare an EA under NEPA, and that the projects meet the General Conformity requirements of the Clean Air Act, as amended.[1] Due to the financial impacts of September 11, 2001, design and construction of the Terminal B FIS Facility has been placed on hold indefinitely. Status updates will be provided in subsequent EDRs until a decision is made to proceed with the project.

1 Letter from John Silva, Manager, Environmental Programs, Federal Aviation Administration, New England Region, to Ken Hietbrink, American Airlines, and Betty Desrosiers, Massport. Dated August 24, 2000.Betty Desrosiers, Massport. Dated August 24, 2000.

Table 3-2 Description and Status of Projects/Planning Concepts in the Terminal Area (as of December 31, 2007) (Continued)

Description	Status
Tenant Projects/Planning Concepts	
3. American Airlines Terminal B, Pier A Improvements Project American Airlines proposed to consolidate all of its Boston operations, including its existing domestic and international operations, into one location. This would be accomplished by reconfiguring the existing gates at Terminal B, Pier A. Improved circulation, ticket space, baggage handling, concessions, and other amenities would be provided. This improvement would enable American Airlines to better accommodate passenger demands and anticipated future passenger growth.	Massport and American Airlines filed a joint ENF on May 31, 2000 (EOEA #12235), a DEIR on May 9, 2001, and an FEIR on June 23, 2001. On August 24, 2000, the FAA determined that the project is categorically excluded from the need to prepare an EA under NEPA, and that the project meets the General Conformity requirements of the Clean Air Act, as amended.[2] Due to the financial impacts of September 11, 2001, design and construction of the American Airlines Terminal B, Pier A Improvements Project has been placed on hold indefinitely. Status updates will be provided in subsequent EDRs until a decision is made as to whether to proceed with the project.
4. Terminal B Walkway Extension Massport considered extending the elevated walkway that connects the Central Garage and northwest corner of Terminal B to the US Airways entrance on the west side of Terminal B.	This project is currently on hold.

Note: See Figure 3-1 for the location of terminal area projects/planning concepts.

Service Area Projects/Planning Concepts

Logan Airport's service areas contain airline support businesses and operations. Land uses in the service areas evolve continually in response to changing airline business, customer, and tenant needs, as well as the impact of the Central Artery/Tunnel (CA/T) Project and other public works projects. Massport continues to explore more efficient ways of using the limited land resources in the service areas. The five service areas at Logan Airport are shown in Figure 3-2 and are described below:

- **North Cargo Area** (NCA) is located in Logan Airport's northwest corner. It is bounded by the main Logan Airport outbound roadway to the south, Route 1A to the west, the Jet Fuel Storage Facility to the north, and the airside apron area to the east. The NCA, which is situated adjacent to the airside area of Logan Airport, is Logan Airport's primary airline support area. It accommodates air cargo and essential airline support businesses including hangars, ground service equipment (GSE) maintenance, and aircraft parking. The NCA is the most appropriate location for businesses and operations that require contiguous airside access and for businesses such as cargo that require adjacent landside as well as airside access. The NCA is the likely location for future hangar expansion either between or in the vicinity of the American Airlines and United Airways hangars, for replacement cargo buildings and for aircraft parking to accommodate changes in aircraft fleet over time.
- **North Service Area** (NSA) is located north of the NCA near the MBTA's Wood Island Station and Runway 15R-33L. The NSA includes flight kitchens, weather and navigation equipment, construction staging areas, and parking areas.

2 Letter from John Silva, Manager, Environmental Programs, Federal Aviation Administration, New England Region, to Ken Hietbrink, American Airlines, and Betty Desrosiers, Massport. Dated August 24, 2000.

- **Southwest Service Area** (SWSA) is located south of Logan Airport's main access roadway, and is bounded on the east by Harborside Drive. Because of its proximity to the terminals and the regional highway system, the SWSA functions as Logan Airport's primary ground transportation hub. Current surface operations include the taxi pool, bus/limousine pool, and rental car operations. A flight kitchen located in the SWSA is to be demolished and its tenant relocated into an existing vacant flight kitchen facility in the NSA.
- **Bird Island Flats/South Cargo Area** (BIF/SCA) is located south of the Logan Airport's SWSA, and is generally bounded on the east by Boston Harbor and on the west by Logan Airport's airside area. The BIF/SCA is two service areas connected by Harborside Drive. The BIF portion has landside access via Harborside Drive and water access via the system of water taxis that shuttle passengers between Downtown Boston, the South Shore, and Logan Airport. BIF development includes the Hyatt Hotel and Conference Center, the Logan Office Center and adjoining garage, an employee parking lot, the Water Shuttle Dock, the Logan Airport Rescue and Fire Fighting Facility Marine Dock, and the Harborwalk that is a publicly accessible promenade along the harbor's edge. The SCA portion is Logan Airport's primary cargo area. It provides landside access and secured airside access. It also accommodates domestic and some international cargo operations.
- **Governors Island** (GI) is located at Logan Airport's southern tip and is bounded by Runway 14-32 and Boston Harbor to the east and south, by Runway 4R to the west, and Runway 9 to the north. GI has functioned as a storage site for the CA/T Project and for construction stockpiles. The area also contains an Aircraft Rescue and Fire Fighting Facility training area, parking for snow removal equipment, a biocell remediation area, and Federal Aviation Administration (FAA) aircraft navigation equipment.

Table 3-3 presents information on the status of each ongoing project and planning concept in the service areas. Both Massport and Logan Airport's tenants are proposing projects or exploring planning concepts to modernize and carry out future improvements to the service areas. These potential future planning concepts are also detailed in Table 3-3. The location of the ongoing service area projects and planning concepts that may potentially be constructed in the future are shown on Figure 3-3.

Figure 3-2 Logan Airport Service Areas

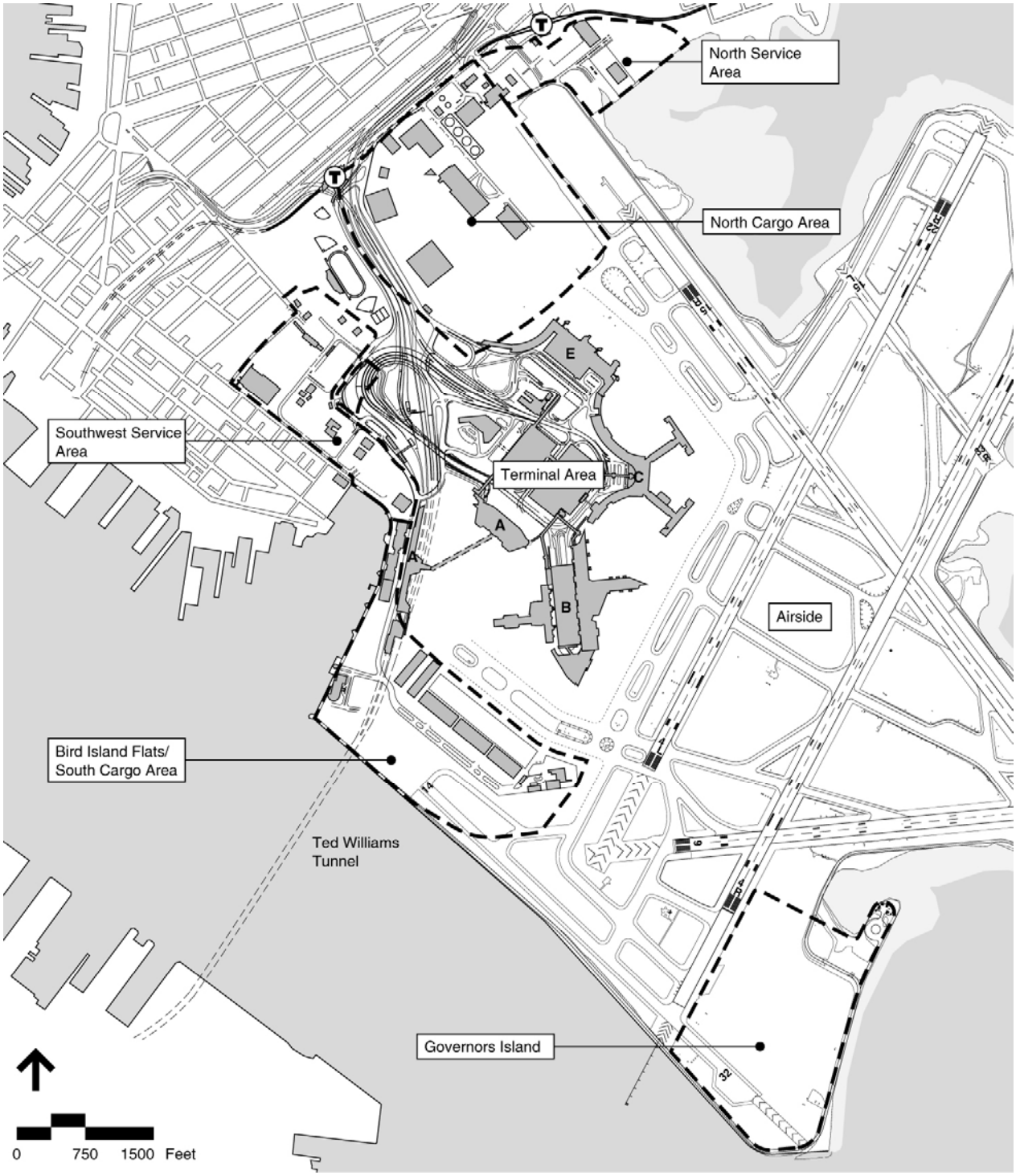


Figure 3-3 Location of Projects/Planning Concepts in the Service Areas

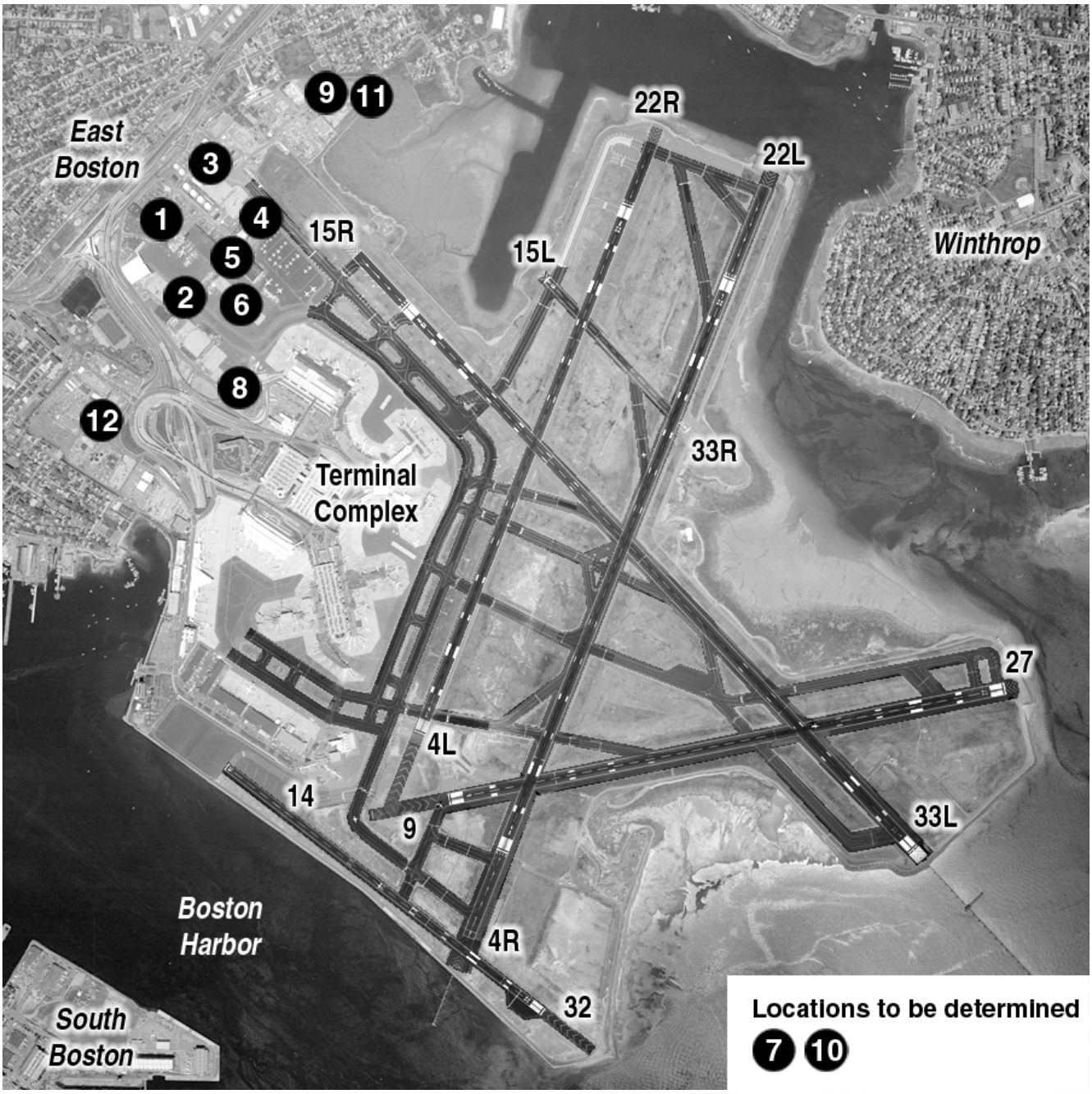


Table 3-3 Description and Status of Projects/Planning Concepts in the Service Areas (as of December 31, 2007)

Description	Status
Massport Projects/Planning Concepts	
1. Robie Parcel Development/Cargo Facility in the NCA This would entail the development of a replacement cargo facility, construction of two aircraft parking positions, and a landscaped buffer (refer to Table 3-5 for details on the buffer portion of this project) adjacent to the SR-2.	In 2003, the United States Postal Service (USPS) had expressed interest in constructing a replacement cargo facility on the Robie Parcel. Following MEPA review, the USPS decided not to pursue the plan. Massport continues to explore opportunities to site a cargo facility and two aircraft parking spaces on this site, consistent with the MEPA certificate. The project would not likely be constructed until after 2010. In the interim, this area will continue to be used for commercial parking.
2. Relocated Compressed Natural Gas (CNG) Station in the NCA This would involve the relocation of Massport's existing CNG Station to accommodate the Robie Parcel Redevelopment in the NCA and the completion of SR-2 by the CA/T Project.	Massport has identified several potential on-Airport parcels in the general vicinity of the NCA for relocation of the CNG station. Relocation is expected to occur in conjunction with construction of a Robie Parcel Replacement Cargo Facility.
3. Consolidated Maintenance Facilities in the NCA This would involve the construction of a new large vehicle storage building in the NCA to provide better storage capacity for essential snow maintenance equipment. Phase 1 would provide covered storage for large snow equipment adjacent to Facilities Building # 2. Existing deicing tanks will be replaced with larger capacity tanks and that will be relocated to an adjacent area. Phase 2 would involve major rehabilitation of the existing Facilities Building # 2.	Phase 1 construction began in 2006 and was completed in spring 2008 when Phase 2 construction commenced.
4. Replacement General Aviation Facility in the NCA This would involve the development and operation of a first-class permanent GA facility at Logan Airport to replace the existing temporary GA facility. The new facility is contemplated to be located adjacent to the existing facility. The development plans include a passenger processing facility and a multi-tenant GSE facility.	Demolition of the existing temporary facility and construction of the new GA Facility were completed in early 2007. The new facility, which officially opened in June 2007 and is operated by Signature Flight Support, achieved LEED certification in May 2008. The new GA Facility also received a Design Merit Award from the New England Chapter of the American Institute of Architects in 2007. It represents a high quality architectural design that is based on sustainable design, construction, and operational principles.
5. Replacement Cargo Facilities in the NCA Construction of new cargo facilities in the NCA would compensate for the loss of cargo facilities that resulted from the CA/T Project, as well as for the projected growth in cargo demand.	This concept is currently under preliminary evaluation. If a decision is made to proceed with this project, permitting and construction would likely commence before 2010.
5A. Temporary Use of a Portion of the Delta Cargo Complex	An asbestos-laden and otherwise unsafe portion of the NCA building that previously housed Burkes Express will be demolished. The site will be used temporarily as commercial parking in the near term (before 2010).

Table 3-3 Description and Status of Projects/Planning Concepts in the Service Areas (as of December 31, 2007) (Continued)

Description	Status
6. Replacement American Airlines Hangar in the NCA This proposal would involve the renovation of portions of the American Airlines Hangar to keep it operational until demolition and reconstruction planning can be completed. Roof, mechanical systems, and restrooms are top priorities for renovation. Ultimately the existing 97,000 square foot American Airlines Hangar would be demolished and replaced with a new hangar that could accommodate Group V aircraft.	Planning and design for this proposal has been placed on hold indefinitely. If a decision is made to go ahead with this project, construction would not likely commence until after 2010.
7. Replacement Hangar Facilities in the NCA Construction of new hangar facilities in the NCA would be required to compensate for the loss of hangar facilities that resulted from the CA/T Project, as well as for the projected growth in demand for hangar space.	A preliminary evaluation of this planning concept has been placed on hold. If planning resumes, construction would not likely commence until after 2010.
Tenant Projects/Planning Concepts	
8. Renovation Gas Station Facility in the NCA The Citgo Station will be renovated.	The Citgo Station building and tanks will be renovated rather than constructing a new on-airport gas station. Renovations include installation of an E85 tank and there will be a change of franchise from Citgo to Gulf. Renovations, currently under construction, will be completed by September 2008.
9. Flight Kitchen Consolidation in the NSA This proposal involves consolidating existing operations, upgrading the NSA roadway infrastructure to improve airside security and access, and constructing landscape edge as a neighborhood buffer.	Due to changes in the flight kitchen industry post-September 11, 2001, expansion of flight kitchen facilities is not anticipated. Initial consolidation of the flight kitchen functions occurred in 2005 with the consolidation of the LSG SkyChef facilities into one building. Further improvements including airside security and access, and landscaping would be done in conjunction with the NSA economy parking lot if it proceeds. A flight kitchen in the SWSA is to be demolished and its tenant relocated into an existing vacant flight kitchen in the NSA.
10. New/Replacement GSE Consolidated Facility in the NCA This planning concept would provide multi tenant maintenance facilities for GSE.	If the conceptual planning for the proposal moves beyond feasibility screening, construction would not likely commence until after 2010.
11. NCA Economy Parking Consolidation	See Table 3-7.

Table 3-3 Description and Status of Projects/Planning Concepts in the Service Areas (as of December 31, 2007) (Continued)

12. Southwest Service Area Redevelopment Program The proposed Southwest Service Area (SWSA) Redevelopment Program comprises a Consolidated Rental Car Facility (ConRAC) and commercial parking. The ConRAC would consolidate on-airport rental car operations and facilities into one integrated facility in order to better serve both the tenants and the traveling public, to reduce ground transportation and air quality impacts on-airport and in the surrounding neighborhoods, and to reduce associated off-airport impacts. The commercial parking component would improve management of the parking supply on the airport. The proposed commercial parking would fully comply with the Logan Airport Parking Freeze. Redevelopment of the SWSA is needed because under current conditions and projected future passenger growth (independent of the project), the SWSA and rental car facilities as they operate today are not adequate to meet Massport's or the rental car companies' future needs. The proposed SWSA Redevelopment Program replaces and upgrades existing uses within the SWSA. The development includes a five-level, approximately 2.8 million square foot garage to accommodate rental car storage and up to 3,000 commercial parking spaces. In addition, approximately 270,000 gross square feet of support facilities for the car rental operations (customer service center and quick turnaround areas), a common bus system, a reconfigured taxi pool, and roadway improvements are also proposed. Phase 2 of the SWSA Buffer (see Table 3-5) will be integrated with the proposed SWSA Redevelopment Program.	An ENF for the SWSA Redevelopment Program was noticed in the November 26, 2007 Environmental Monitor and the Secretary's Certificate including the scope for the DEIR was issued on January 30, 2008 after an extended public comment period. The DEIR/EA was filed with the EEA on June 30, 2008 and the public review period commenced on July 9, 2008. Massport requested that the 30-day public review period be extended to approximately 80 days, with public comments due by September 26, 2008.

Note: See Figure 3-3 for the location of service area projects/planning concepts.

Airside Area Projects/Planning Concepts

The airside area includes all Logan Airport land from the edge of the terminal buildings to the Logan Airport harbor boundary, incorporating the Logan Airport apron, runways, gates, and other airfield operating facilities. Airside improvements include upgrades and improvements to the airfield to enhance the operational efficiency and safety of Logan Airport. Table 3-4 describes the status of projects (shown on Figure 3-4) and planning concepts under consideration for Logan Airport's airside area as of December 31, 2007.

Figure 3-4 Location of Projects/Planning Concepts on the Airside

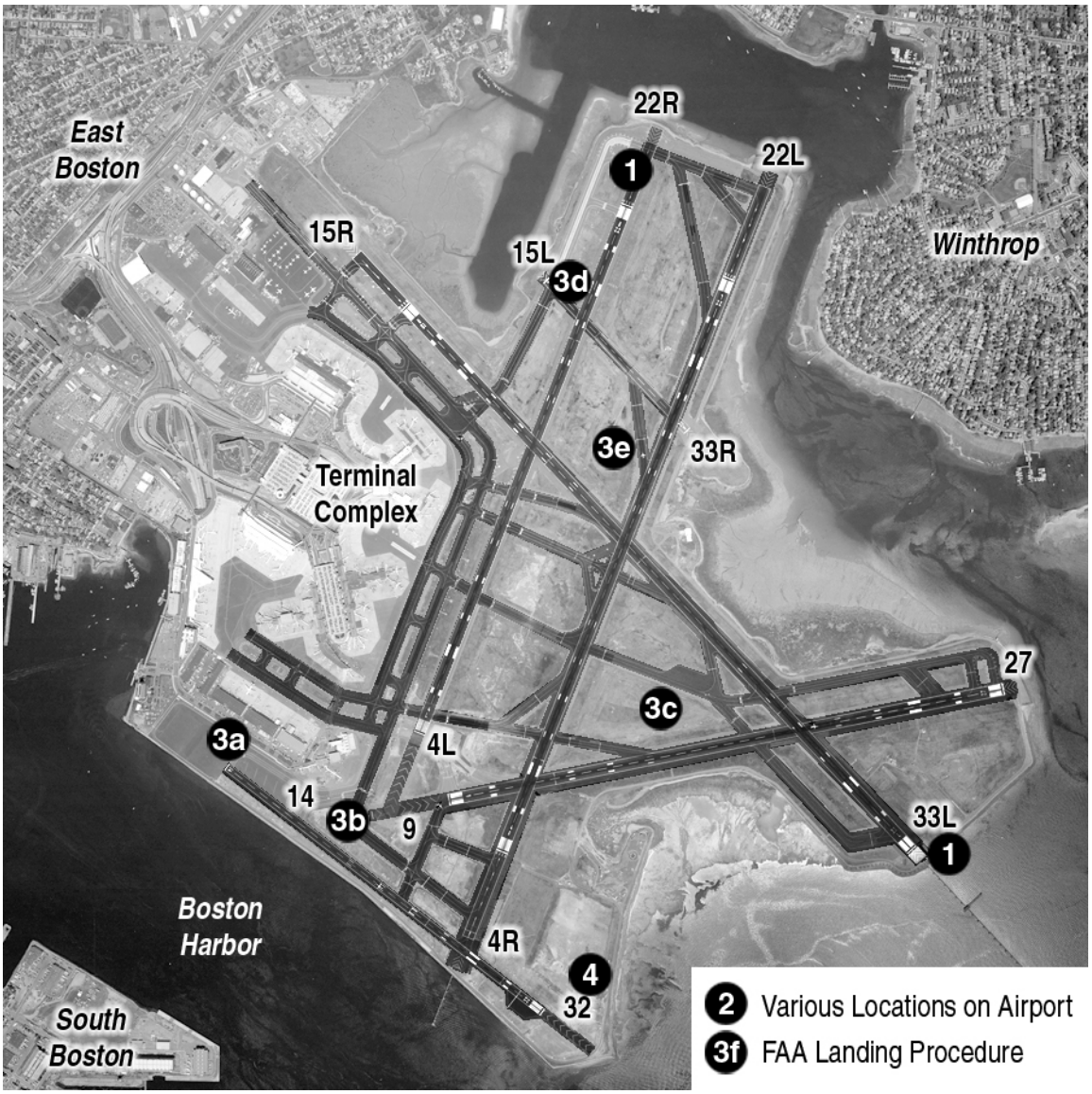


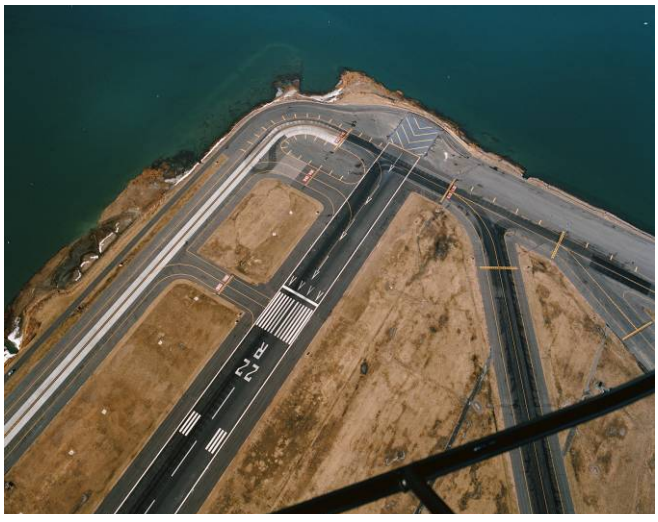
Table 3-4 Description and Status of Projects/Planning Concepts on the Airside (as of December 31, 2007)

Description	Status
1. Runway 22R and 33L Runway Safety Enhancements The FAA requires runway safety areas (RSA) to accommodate aircraft overruns, undershoots and veeroffs in emergency situations. Massport is continuously looking for opportunities to increase the margin of safety for all runways and where practicable providing FAA-standard RSAs at all locations. At Logan Airport, the FAA-standard RSA is typically 500-feet wide by 1,000 feet long at each runway end. Where this space is not available, the FAA has approved the use of Engineered Materials Arresting System (EMAS) for aircraft overrun protection. EMAS uses a system of collapsible concrete blocks that can stop an aircraft by exerting predictable forces on the landing gear while minimizing aircraft damage. In 2004, the FAA approved installation of a 190-foot section of EMAS at Runway 22R. The FAA also has directed Massport to evaluate opportunities for additional safety enhancements at this location. Massport installed a 158-foot of EMAS at Runway 33L in 2006, in anticipation of full environmental review of additional alternatives. In 2006, Massport initiated an assessment of opportunities to further enhance the existing RSAs at Runway 22R and 33L.	Construction of an EMAS bed at Runway 22R was completed in 2005. An EMAS bed was installed at Runway 33L in 2006. Evaluation of additional safety enhancements for the RSAs at both runway ends are now planned to be advanced as a separate project. It is anticipated that Massport will file an ENF with MEPA in 2008 to describe proposed RSA enhancements at both runway ends, followed by a combined MEPA/NEPA process. Construction will not commence until the required environmental approvals are obtained. Note: The proposed RSA enhancements at Runway 33L will replace the RSA improvement that was planned and permitted, but not constructed, for this location as part of EOEA# 5122.
2. Security Wall Installation of a security wall along the perimeter of the air operations area at Logan Airport.	Perimeter wall installation is underway and is expected to be completed by late 2008.
3. Logan Airside Improvements Planning Project The project involves construction of a new unidirectional Runway 14-32, centerfield taxiway, extension of Taxiway D, realignment of Taxiway N, improvements to the southwest corner taxiway system, relocation of cargo buildings, and reduction in approach minimums on Runways 22L, 27, 15R and 33L. These airfield improvements will reduce current and projected levels of aircraft delay and enhance airfield safety at Logan Airport. The sub-components of this project, as described in the *Airside EIS/EIR,* are presented below along with the associated status.	Construction of Runway 14-32 commenced in 2004 and the runway opened on November 23, 2006. Taxiway improvements were approved in a Record of Decision issued by the FAA in April, 2007 and construction of the taxiway improvements commenced in 2007. The first full year of operation of Runway 14-32 was 2007.
a. Demolition and relocation of Cargo Buildings 60 and 61.	This component of the project was completed in 2006.
b. Construction of a new unidirectional 5,000-foot Runway 14-32.	Construction began in 2004, and continued through 2006. The new Runway 14-32 became operational on November 23, 2006. The first full year of operation of Runway 14-32 was 2007.
c. Construction of a 2,000 foot Taxiway D extension, Taxiway D straightening and realignment, and southwest corner taxiway realignment and the installation of all lighting, marking, signage and drainage to support these improvements.	The southwest corner taxiway realignment component of the project was completed in 2007.
d. Straightening and realignment of Taxiway N.	This component of the project is anticipated to commence by 2011.

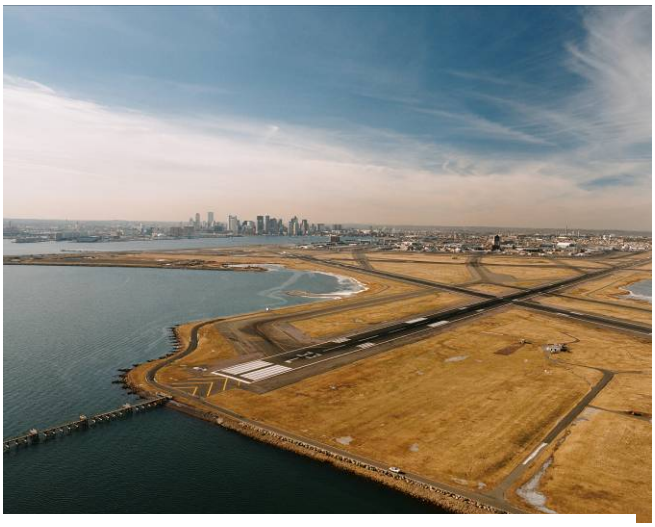
Table 3-4 Description and Status of Projects/Planning Concepts on the Airside (as of December 31, 2007) (Continued)

Description	Status
e. Construction of a 9,300 foot long centerfield taxiway that would be located between and parallel to Runway 4L-22R and Runway 4R-22L.	The FAA approved the centerfield taxiway in April, 2007. Construction commenced in the fall of 2007 and will be completed in 2009.
f. Reduction in approach minimums on Runways 22L, 27, 15R, and 33L by FAA.	Reduction in approach minimums on Runway 15R and 33L was addressed in the Airside EIS/EIR. Implementation will be affected by realignment of the Instrument Landing System (ILS) localizer. Construction impacts of relocation of the ILS localizer are planned to be addressed in the forthcoming EA/EIR for the proposed enhancements to the RSA at the end of Runway 33L.
4. Governors Island Aircraft Parking Massport is evaluating the feasibility of providing additional aircraft parking at Governors Island for the following: (1) Remain over night (RON) aircraft; (2) Cargo Aircraft; and (3) International aircraft. RON aircraft are generally commercial passenger aircraft that fly into the airport at night and fly out in the morning. Airlines sometimes schedule and position more aircraft than there are gate positions, and therefore remote aircraft parking positions are required. Remote aircraft parking is also appropriate for cargo aircraft that generally arrive in the morning and remain on the ground until their late evening departure. Finally, some international scheduled and charter aircraft that have long turnaround times should be parked remotely when there is a high demand for gates.	Preliminary concepts being evaluated by Massport involve the development of 20 to 50 aircraft positions and ancillary uses. If the concept is deemed feasible and planning continues, it is anticipated that construction would occur no sooner than 2010.

Note: See Figure 3-4 for the location of airside projects/planning concepts.



Runway 22R Runway Safety Area Enhancement Project Area



Runway 33L Runway Safety Area Enhancement Project Area

Airport Buffer Projects

Massport has committed up to $15 million for the planning, construction, and maintenance of buffer areas around Logan Airport. Since that time, much of the buffer program has been completed, including Bayswater Buffer, the SR-2 Roadway Buffer and the Navy Fuel Pier Buffer. Several areas, located generally along the Logan Airport's perimeter boundary, have been identified to provide attractive landscape buffers between airport operations and adjacent East Boston neighborhoods. The buffers are being designed in consultation with Logan Airport's neighbors and other interested parties in an open community planning process. To discuss East Boston open space planning, Massport also participates in meetings with other state, non-profit, and city agencies including MassHighway, the CA/T Project, the Trust for Public Land, the City of Boston's Conservation Commission, the Boston Redevelopment Authority, and the Boston Natural Areas Network. Table 3-5 describes the status of ongoing buffer projects and other buffer projects or planning concepts under consideration as of December 31, 2007. Figure 3-5 shows the location of these buffer projects.

Figure 3-5 Location of Airport Edge Buffer Projects/Planning Concepts

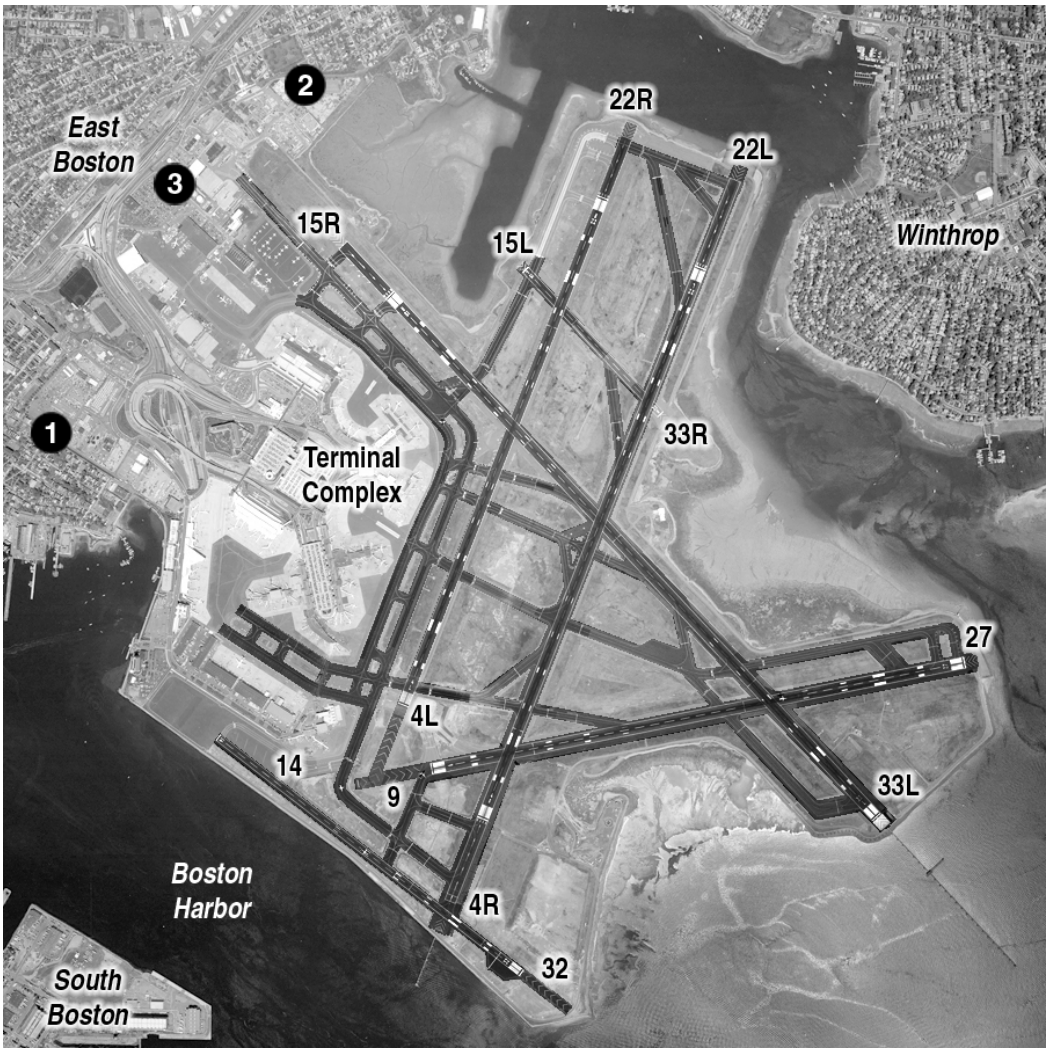


Table 3-5 Description and Status of Airport Edge Buffer Projects/Planning Concepts (as of December 31, 2007)

Description	Status
1. SWSA Buffer Phase 1 of this project involves the construction of an approximately half-acre linear area with landscaping and lighting improvements along Maverick Street that will include evergreen and deciduous trees, ornamental shrubs, and groundcovers.	Construction of Phase 1 of the SWSA Buffer began in 2005 and was completed in the fall of 2006.
Phase 2 of this project involves landscaping and solid barriers.	Phase 2 of the SWSA Buffer will be integrated with the proposed SWSA Redevelopment Program. Phase 2 consists of installing landscaping (i.e., densely planted or planted atop earth berms for enhanced separation) and solid barriers such as fences and walls. The DEIR/EA was filed with the EEA on June 30, 2008 (see Table 3-3 for details).
2. NSA Buffer The NSA Buffer involves landscaped improvements at the airport boundary.	A schematic design was developed during the community planning process. However, this project was suspended at the request of the neighborhood due to concerns about increased public access in this area. If the NSA Economy Parking Lot is completed, a landscaped buffer will be constructed along the MBTA tracks at the edge of the parking area, and a vegetated area will be established between the parking area and Wood Island Marsh.
3. Bremen Street Park The 18-acre Bremen Street Park being constructed by the CA/T Project will be East Boston's second largest neighborhood park. The park will have a variety of facilities, a direct pedestrian connection to MBTA's new Blue Line Airport Station, and a half mile segment of the three mile East Boston Greenway. The park is being built on land that was previously used as off-airport parking (ParkEx).	Construction of Bremen Street Park as part of the CA/T Project commenced in 2004. In August 2004, Massport was designated by the state legislature as the entity to own, operate, and maintain the park upon completion. The CA/T project completed significant portions of the park in early 2007 and the opening occurred on June 1, 2007. It is anticipated that final construction of the park will be completed in 2008.

Note: See Figure 3-5 for the location of airport edge buffer projects/planning concepts.

Airport-wide Projects

Massport is planning or implementing a number of airport-wide projects/planning concepts as described in Table 3-6.

Table 3-6 Description and Status of Future Airport-wide Projects/Planning Concepts (as of December 31, 2007)

Description	Status
1. Logan Airport Landscaping Massport prepared a master plan to unify the landscape and open space areas of the roadway and terminal area projects (see below). The design concept is a New England Landscape that will be characterized by informal plantings of birch trees and evergreens. Once completed, the project will include over 15 acres of landscaping.	
a. Terminal Area Roadway Landscape. Approximately 6 acres of land between the roadways and terminal areas would be landscaped. This includes land adjacent to the egress roadway (between the West Garage, Terminal E parking, the Central Cooling and Heating Plant, and the Citgo Station).	One acre of landscaping in the area adjacent to the egress roadway was completed in 2003. The remainder was completed in 2007.
b. 7D2 Airport Roadway Landscape. Approximately 7.5 acres of landscaping will be provided in the area roughly bounded by Hotel Drive and Harborside Drive (referred to as the "U turn"). This includes 6 acres of lawn being constructed as part of the CA/T Project.	This area was planted initially in 2002. In 2005, Massachusetts Highway Department (MHD) completed the project.
c. 8A Airport Roadway Landscape. This project area encompasses land located approximately between the American Airlines hangar and the Delta reservations building and includes segments of I-90 and Rte 1A.	Approximately 3.5 acres of landscaped area was constructed by the CA/T. Construction was completed in the spring of 2006.
2. Logan Airport Wayfinding System Provide a comprehensive wayfinding system for Logan Airport facilities including terminals, terminal curbside, parking garages and approach roadways including airport wide signage analysis and planning, development or design guidelines and graphic standards, and a master implementation plan for future projects.	The project design guidelines and graphic standards were completed in early 2006. Program implementation began in 2006 and is expected to be completed by 2010.

Airport Parking Projects/Planning Concepts

Historically, parking supply at Logan Airport has varied in terms of the specific locations and sizes of individual lots, the mix of parking spaces for air travelers and employee spaces, and the number of spaces in and out of service at any one time primarily due to construction projects being undertaken at Logan Airport. *Chapter 5, Ground Transportation* contains additional information on the historic and existing supply of parking at Logan Airport. The total number of employee and commercial parking spaces permitted at Logan Airport is limited by the Logan Airport Parking Freeze under the State Implementation Plan.

Table 3-7 describes current commercial parking projects at Logan Airport. The location of these projects is shown on Figure 3-6.

Figure 3-6 Location of Commercial Parking Projects/Planning Concepts

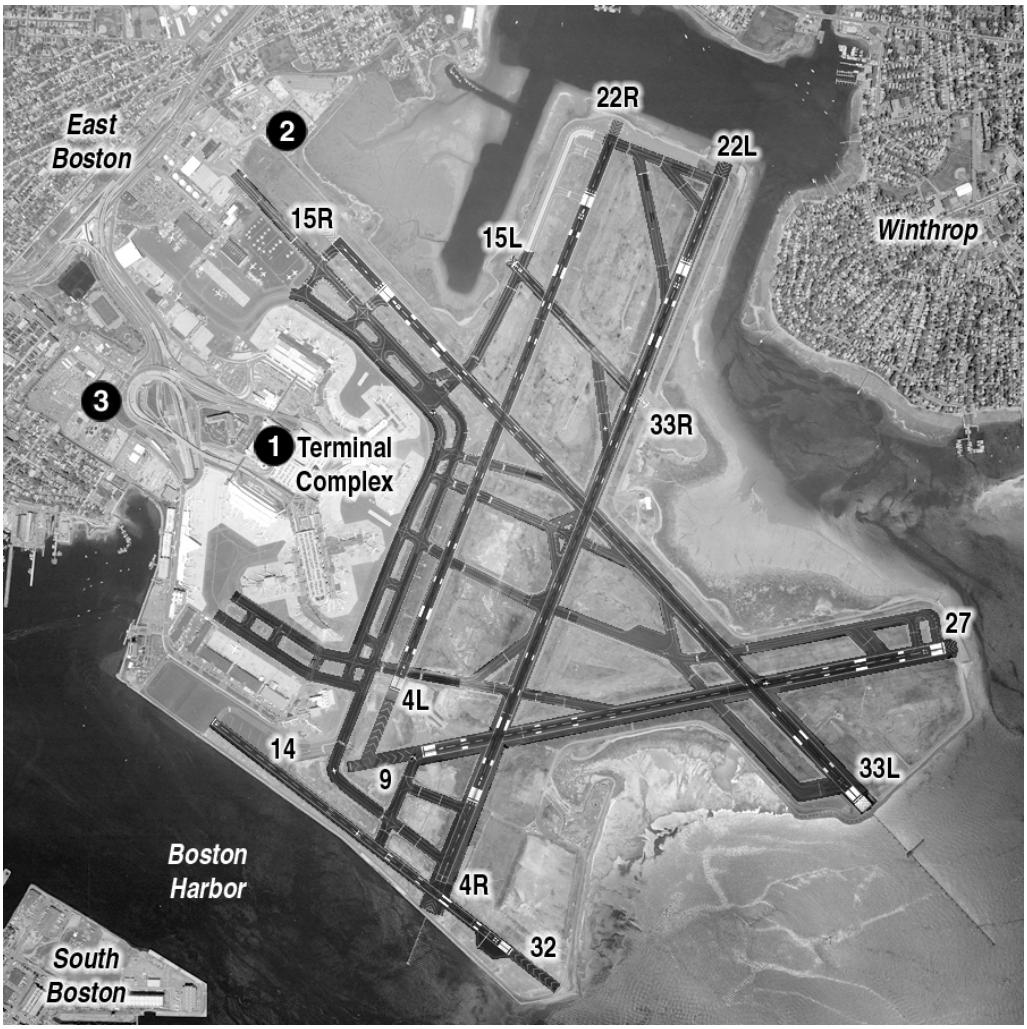


Table 3-7 Description and Status of Commercial Parking Projects/Planning Concepts (as of December 31, 2007)

Description	Status
1. West Garage Project Phase I comprised the consolidation of 3,150 parking spaces in a new structure between the Central Garage and the Hilton Hotel. The project included elevated pedestrian walkways with moving sidewalks to all terminals. Massport evaluated design options for Phase II of the West Garage and concluded that the most cost effective way to proceed with Phase II was to add three levels of parking with 2,800 parking spaces to the Central Garage. A Notice of Project Change (NPC) was filed with the MEPA Office on October 31, 2000 describing the proposed changes and associated environmental impacts. The Secretary's Certificate on the NPC, issued December 8, 2000, indicated that no further MEPA review is required.	Construction of Phase I commenced in October 1995 and the facility opened September 8, 1998. Construction of Phase II commenced in the spring of 2004 and was completed in early 2007.
2. NSA Economy Parking Consolidation (EOEA#13456) This lot will be located approximately 1,750 feet north of the existing economy lots along Prescott Street. The MBTA Blue Line tracks separate the site from adjacent neighbors. As originally envisioned, the project would redevelop three parcels, totaling ±15.7 acres, into a combined economy parking facility with the capacity for up to 1,750 vehicles. This project would entail reusing existing paved parking areas, relocating a Massport equipment storage area; redeveloping the site for economy parking; and encircling the new parking lot with a security fence and an attractive landscape area. The parking areas would include a revenue control gate, landscaping, several transportation center kiosks/ passenger bus shelters, perimeter fencing and lighting designed specifically to minimize neighborhood intrusion. An 8-foot high fence would encircle the site perimeter. The project would remain within the limits of the Logan Airport Parking Freeze.	Site preparation (drainage, grading, etc.) commenced in late 2005. The project is currently on hold but may be completed by 2010.
3. Southwest Service Area Redevelopment Program As described in detail in Table 3-3, the proposed SWSA Redevelopment Program comprises a ConRAC and commercial parking facility. The ConRAC would consolidate on-airport rental car operations and facilities into one integrated facility in order to better serve both the tenants and the traveling public, reduce ground transportation and air quality impacts on-airport and in the surrounding neighborhoods, and to reduce associated off-airport impacts. The commercial parking component would improve management of the parking supply on the airport, and would remain within the requirements of the Logan Airport Parking Freeze.	See Table 3-3.

Note: See Figure 3-6 for the location of commercial parking projects/planning concepts.

4

Regional Transportation Context

Introduction

This chapter reports on the status of the New England regional airports in 2007 and describes Massport's ongoing efforts to support an efficient regional air transportation network. The chapter specifically describes:

- Airport passengers and aircraft operations for the regional airports in 2007, activity level changes over the prior year, and a comparison to activity levels and growth at Logan Airport. The primary regional airports considered in this chapter are: T.F. Green Airport, Rhode Island (RI); Manchester-Boston Regional Airport, New Hampshire (NH); Bradley International Airport, Connecticut (CT); Burlington International Airport, Vermont (VT); Bangor International Airport, Maine (ME); Portland International Jetport, ME; Pease International Tradeport, NH; Worcester Regional Airport, Massachusetts (MA); Hanscom Field; and Tweed-New Haven Airport, CT.
- Changes in airline service levels and other factors that have contributed to trends in regional airport activity.
- Status of improvement plans and projects at the regional airports.
- Massport's initiatives and joint efforts with other transportation agencies to improve the efficiency of the New England regional air transportation system.

Key Findings

In 2007:

- The total number of air passengers utilizing New England's primary commercial service airports increased marginally, from 47.1 million in 2006 to 47.2 million. Of the 47.2 million air passengers using New England's primary commercial service airports, 60 percent of air passengers used Logan Airport as compared to 88 percent in 1995. When measured by the number of aircraft operations, activity levels fell by 2.1 percent, from 1.33 million operations in 2006 to 1.31 million operations. This reflects substantial changes in the commercial aviation sector and the continued decline of general aviation activity nationally.

- The region's passenger growth was largely driven by growth at Logan Airport, where passenger traffic increased by 1.4 percent. In contrast, passenger traffic at the regional airports fell by 1.6 percent.
- The continued drop in passenger traffic at the regional airports is a reflection of the challenging operating environment airlines in the United States (U.S.). Major airlines reduced capacity at the regional airports in 2007 as they eliminated unprofitable routes and reduced their domestic flying to deal with the high and rising cost of fuel.
- The average number of seats per scheduled flight at the regional airports declined from 87 in 2006 to 84 in 2007. The reduction in average aircraft sizes reflects a general shift from service in mainline jets to smaller regional jets (RJs).
- General Aviation (GA) operations at New England regional airports declined by 3.5 percent from 2006 levels. Declines in GA activity in New England continue to outpace declines in the rest of the country. According to the Federal Aviation Administration (FAA), GA activity declined by 2.6 percent nationally in 2007, largely due to the impact of rising fuel costs on recreational flying.

New England Regional Airport System

As shown in Figure 4-1, the New England region is served by Logan Airport, the primary international hub and domestic destination, and a system of ten regional commercial service airports[1] (regional airports); together, these 11 airports accommodate nearly all of New England's air travel demand. The regional airports range in activity levels from the Bradley International Airport in Connecticut, which served 6.5 million commercial passengers in 2007, to Tweed-New Haven Airport, also in Connecticut, which handled nearly 75,000 passengers in 2007.

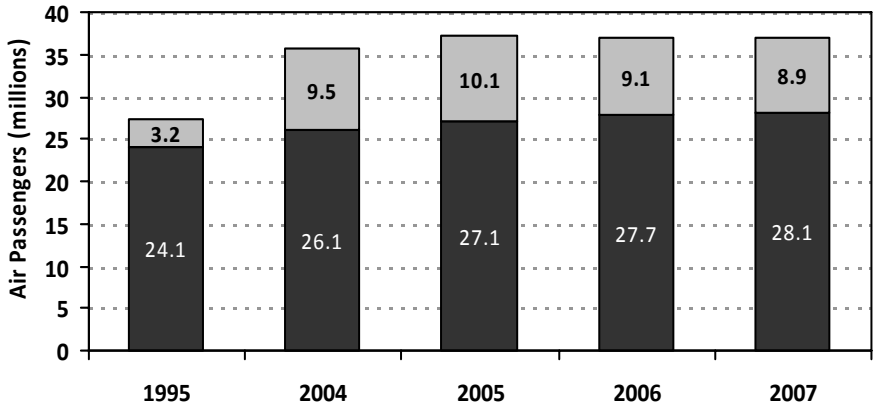
The regional airports that are closest to and have the greatest influence on passenger traffic and aircraft activity at Logan Airport are T.F. Green Airport in Warwick, Rhode Island and Manchester-Boston Regional Airport in Manchester, New Hampshire. These airports not only serve their own market areas, but they also draw some of the passenger traffic from the Boston market area. While Worcester Regional Airport is currently not served by scheduled air carriers, it would also draw traffic from the Greater Boston market area if it were to gain a critical mass of airline services. In 2007, T.F. Green, Manchester-Boston Regional and Worcester Regional Airports served 24.1 percent of the combined passengers at the four airports serving the greater-Boston market area, down from 24.8 percent in 2006. In 1995, T.F. Green, Manchester-Boston Regional and Worcester Regional Airports served 11 percent of the combined passengers at the four airports. Figure 4-2 depicts the historic distribution of air passengers for these three regional airports and Logan Airport.

1 The *New England Regional Airports Air Passenger Service Study* (FAA, 1995) defined the Bradley International, T.F. Green, Manchester, Portland International Jetport, Bangor, Burlington, Worcester Regional and Tweed-New Haven Airports as the region's principal commercial airports, other than Logan Airport, since all of these airports either supported or had previously supported commercial jet passenger services. Subsequently, in 1999, limited commercial passenger service was introduced at Hanscom Field in Bedford, MA and at Pease International Tradeport in Portsmouth, NH. These 11 airports are included in the New England Regional Airport Sytem Plan (NERASP) Study, which was published in 2006.

Figure 4-1 New England Regional Transportation System



Figure 4-2 Passenger Activity Levels at Logan Airport and Surrounding Airports



Note: Grey shading represents passenger activity at T.F. Green Airport (PVD), Manchester-Boston Regional Airport (MHT), and Worcester Regional Airport (ORH). Black shading represents passenger activity at Logan Airport.

Regional Airport Activity Levels

Passengers

In 2007, New England's 11 primary commercial airports accommodated 47.2 million passengers. Total air passenger traffic at the New England airports increased slightly over the prior year, by just 0.1 percent (Table 4-1). As a whole, air passenger traffic in the region grew more slowly than in the overall U.S. domestic market, which grew by 3.3 percent.

Growth in the region was largely driven by growth at Logan Airport, where passenger traffic grew by 1.4 percent. In contrast, passenger traffic at the regional airports fell by 1.6 percent. Consequently, the regional airports' share of New England passengers declined further to 40.5 percent in 2007 (Figure 4-3). As shown in Figure 4-3, the regional airports' share of New England passengers was 31.3 percent in 1995. The continued drop in passenger traffic at the regional airports is a reflection of the challenging operating environment facing U.S. airlines. Climbing fuel prices and intense price competition within the airline industry has forced the airlines to reduce capacity in unprofitable markets. Trends at Logan Airport and the state of the U.S. airline industry are discussed in detail in *Chapter 2, Activity Levels*.

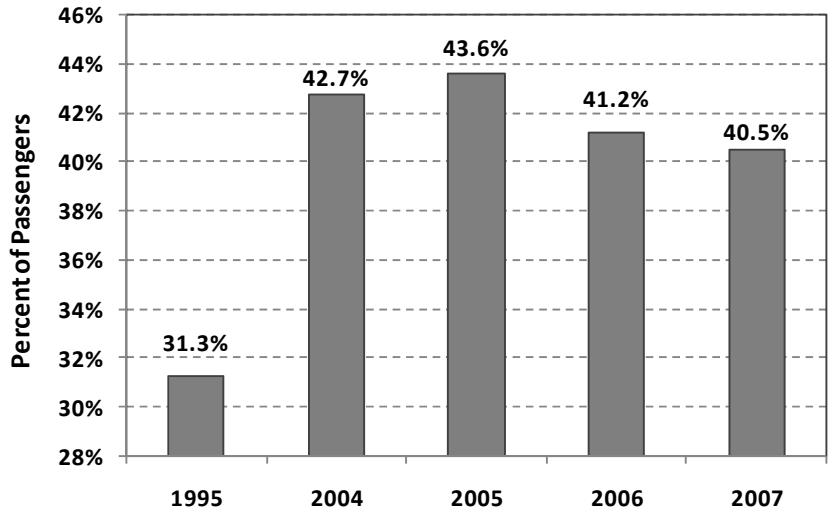
Nearly all of the regional airports experienced a drop in passenger traffic in 2007. Among the largest regional airports, passenger traffic fell sharply at Bradley International and T.F. Green Airports, but only slightly at Manchester-Boston Regional Airport. Pease International Tradeport in New Hampshire, which secured new low-fare services in 2007, experienced the greatest passenger growth with a 98.6 percent increase since 2006. Worcester Regional Airport, at the other extreme, experienced the greatest decline with a 97.5 percent decrease, as the only commercial airline providing service exited the Worcester market early in 2007. Changes in scheduled services at the regional airports are discussed below.

Table 4-1 Passenger Activity at New England Regional Airports and Logan Airport

Airport	Passenger Levels (millions)[1] 2004	2005	2006	2007	Percent Change (2006-2007)
Bradley International	6.74	7.38	6.91	6.52	(5.60%)
T.F. Green	5.51	5.73	5.20	5.02	(3.52%)
Manchester-Boston Regional	3.97	4.33	3.90	3.89	(0.17%)
Portland International Jetport	1.37	1.45	1.41	1.65	17.14%
Burlington	1.25	1.37	1.37	1.41	3.00%
Bangor	0.45	0.48	0.42	0.40	(4.46%)
Tweed-New Haven	0.08	0.13	0.10	0.07	(22.55%)
Pease International Tradeport	0.05	0.01	0.06	0.11	98.61%
Hanscom Field	0.02	0.02	0.02	0.02	(1.60%)
Worcester Regional	0.00	0.00	0.03	0.00	(97.49%)
Subtotal	19.45	20.91	19.41	19.10	(1.59%)
Logan Airport, MA	26.14	27.09	27.73	28.10	1.35%
Total	45.59	48.00	47.13	47.20	0.14%

Source: Massport and individual airport data reports.
Note: Data for Logan Airport includes international and connecting passengers.
1 All passengers in millions. Passenger levels are calculated by adding enplaned plus deplaned passengers (where available) or multiplying enplaned passengers by 2. 2005 statistics are from the New England Regional System Plan Study, Fall 2006.
2 Worcester Regional Airport served fewer than 5,000, but more than 0, passengers each year between 2004 and 2005.

Figure 4-3 Regional Airports' Share of New England Passengers



Aircraft Operations

As shown in Table 4-2, commercial airline operations declined at many of the regional airports consistent with airline strategies to reduce scheduled domestic services as a means to remain profitable in the high fuel price environment. Total aircraft operations from 2000 to 2007 are provided in *Appendix F, Regional Transportation Context*.

GA and military operations at the combined New England regional airports also declined in 2007. The drop is consistent with the declining national trend for GA and military operations. GA, which includes aircraft operations conducted by air taxi providers, businesses, private pilots, fractional ownership programs, law enforcement, air ambulances, student and recreational pilots, and other aviation users, is dominated by recreational fliers that are highly sensitive to fuel prices.

Despite the reduced flying activities, GA operations continue to be the common aircraft activity at the regional airports. In 2007, GA accounted for 53.1 percent of total aircraft operations at the regional airports. By comparison, GA represents only 7.2 percent of aircraft activity at Logan Airport, which primarily accommodates the region's domestic and international commercial airline operations.[2] Because GA operations declined at a faster rate than commercial airline operations, the share of total regional airport activity operated by commercial airlines rose slightly to 41.5 percent compared to 41 percent in 2006.

Overall, the regional airports accommodated a much greater share of the region's aircraft operations than their share of air passengers due to high levels of GA traffic. While 40.5 percent of New England's air passengers enplaned or deplaned at one of the regional airports, these airports accounted for 69.4 percent of the region's aircraft activity. On average, there were approximately 21.1 passengers per aircraft operation at the regional airports compared to 70.3 passengers per operation at Logan Airport.

Service Developments at the Regional Airports

In 2007, scheduled airline departures at the 11 regional airports combined was nearly even with 2006 levels. However, available seat capacity declined as airlines scaled back services in certain markets by substituting smaller RJs for larger mainline jets. Table 4-3 shows the share of scheduled domestic departures for Logan Airport and the ten regional airports in recent years for the peak travel month of August.

Bradley International Airport in Windsor Locks, CT lost its mainline jet services to nine markets, five of which were due to Delta Air Lines' decision to eliminate its low-fare Song Airways operation in 2006. While some services were eliminated at Bradley International Airport, others were downgraded to smaller RJ aircraft, leading to a reduction in Bradley's seat capacity in 2007. T.F. Green Airport in Warwick, RI experienced similar trends, but to a greater degree. American Airlines ended mainline jet service at T. F. Green Airport in March 2006 and Delta Air Lines, Northwest Airlines and US Airways, all reduced their jet service levels, with some services being transferred to smaller RJs.

2 There are no military operations at Logan Airport.

Table 4-2 Aircraft Operations by Classification for New England's Airports

Airport	2006 Commercial[1]	2006 General Aviation[2]	2006 Military & Other[2]	2006 Total	2007 Commercial[1]	2007 General Aviation[2]	2007 Military & Other[2]	2007 Total	Share of NE Total
Bradley International	111,341	34,548	4,348	150,237	107,097	29,308	5,097	141,502	10.83%
T.F. Green	81,282	25,510	229	107,021	80,525	22,984	242	103,751	7.94%
Manchester-Boston Regional	68,590	25,507	708	94,805	69,134	23,959	644	93,737	7.18%
Portland International Jetport	38,663	35,572	1,536	75,771	41,450	31,724	1,384	74,558	5.71%
Burlington	41,342	44,471	9,299	95,112	39,928	47,521	9,528	96,977	7.42%
Bangor[3]	23,466	29,848	22,359	75,673	22,571	25,542	20,949	69,062	5.29%
Tweed-New Haven	5,177	51,702	1,157	58,036	4,594	51,200	944	56,738	4.34%
Pease International Tradeport[4]	3,981	25,962	7,797	37,740	4,270	27,000	8,017	39,287	3.01%
Hanscom Field	3,057	167,560	1,433	172,050	3,477	160,992	1,438	165,907	12.70%
Worcester Regional	3,793	56,770	609	61,172	3,162	61,296	879	65,337	5.00%
Subtotal	380,692	497,450	49,475	927,617	376,208	481,526	49,122	906,856	69.42%
Logan Airport	374,675	31,444	NA	406,119	370,905	28,632	NA	399,537	30.58%
Total	755,367	528,894	49,475	1,333,736	747,113	510,158	49,122	1,306,393	100.00%

Airport	Percent Change (2006-2007) Commercial[1]	General Aviation[2]	Military & Other[2]	Total
Bradley International	(3.81%)	(15.17%)	17.23%	(5.81%)
T.F. Green	(0.93%)	(9.90%)	5.68%	(3.06%)
Manchester-Boston Regional	0.79%	(6.07%)	(9.04%)	(1.13%)
Portland International Jetport	7.21%	(10.82%)	(9.90%)	(1.60%)
Burlington	(3.42%)	6.86%	2.46%	1.96%
Bangor[3]	(3.81%)	(14.43%)	(6.31%)	(8.74%)
Tweed-New Haven	(11.26%)	(0.97%)	(18.41%)	(2.24%)
Pease International Tradeport[4]	7.26%	4.00%	2.82%	4.10%
Hanscom Field	13.74%	(3.92%)	0.35%	(3.57%)
Worcester Regional	(16.64%)	7.97%	44.33%	6.81%
Subtotal	(1.18%)	(3.20%)	(0.71%)	(2.24%)
Logan Airport	(1.01%)	(8.94%)	0.00%	(1.62%)
Total	(1.09%)	(3.54%)	(0.71%)	(2.05%)

Source: Massport, FAA Tower Counts, FAA Terminal Area Forecast, and individual airport records.

1 May include Air Taxi operations by fractional jet operators. FAA Tower counts include some fractional jet operations as "Air Taxi/Commuter" operations.

2 Includes itinerant and local general aviation and military operations at the regional airports. There are no military operations at Logan Airport.

3 Includes international aircraft making a technical stop at Bangor Airport.

4 Pease International Tradeport data for 2005 provided by the Pease Development Authority.

Manchester-Boston Regional Airport experienced an increase in total scheduled services in 2007 largely as a result of growth by Southwest Airlines which increased its scheduled departures at Manchester-Boston Regional Airport by nearly 26 percent. Despite the increases by Southwest Airlines, total passenger traffic at the Airport declined slightly. While Southwest Airlines grew substantially at Manchester-Boston Regional Airport in 2007, it only increased scheduled service from T.F. Green Airport by 3.1 percent in 2007.

Portland International Jetport experienced a 17.1 percent growth in passenger levels in 2007, compared to a 2.9 percent decline from 2005 to 2006 (Table 4-1). The increase from 1.4 million passengers in 2006 to 1.7 million in 2007 was largely due to new services by LCCs. AirTran Airways began service from Portland International Jetport to Baltimore/Washington International Airport and Orlando International Airport in June 2007, and JetBlue Airways increased scheduled departures to New York JFK Airport by 76.5 percent. Overall in 2007, mainline jet departures at Portland International Jetport increased by 59.8 percent over the prior year.

Service trends at many of the smaller regional airports were similar. Airlines at Burlington International Airport reduced scheduled regional jet departures to airline connecting hubs and significantly reduced scheduled turboprop flights to Logan Airport. Bangor International Airport also lost scheduled services to Logan Airport and experienced an overall service shift from larger to smaller aircraft. At Tweed-New Haven Airport, US Airways sharply cut service frequencies to Philadelphia International Airport, the airport's only connecting hub market. The introduction of turboprop services by Pan Am Clipper Connection to small markets in the Northeast was not enough to offset the reductions by US Airways. Worcester Regional Airport lost all commercial service at the beginning of 2007 when Allegiant Air discontinued its Worcester-Orlando Sanford service.

Scheduled services grew at Hanscom Field and Pease International Tradeport in 2007, but total services at these airports remained well below the levels at most of the other regional airports. Pan Am Clipper added nonstop turboprop service between Hanscom Field and Elmira, New York. Growth at Pease International Tradesport was due to the introduction of low-fare services by Skybus, which entered the market in May 2007 with service to Columbus, Ohio.

Table 4-3 shows the share of scheduled domestic departures for Logan Airport and the ten regional airports in recent years for the peak travel month of August. In August 2007, the regional airports accounted for 47.8 percent of the New England region's scheduled domestic departures, up slightly from 47.2 percent in August 2006.

Despite the service reductions at the regional airports in 2007, the trend of increased reliance on service to points outside New England continued. Figure 4-4 shows that the share of New England-originating flights that also end in New England, at any airport, has been declining steadily since 1985. Last year, the share fell slightly from 25.1 percent in 2006 to 24.8 percent in 2007. The significance of this trend is that it reduces pressure on Logan Airport and the other large New England airports to provide connecting service for small planes from small communities to other destinations, resulting in more convenient air service routings for passengers.

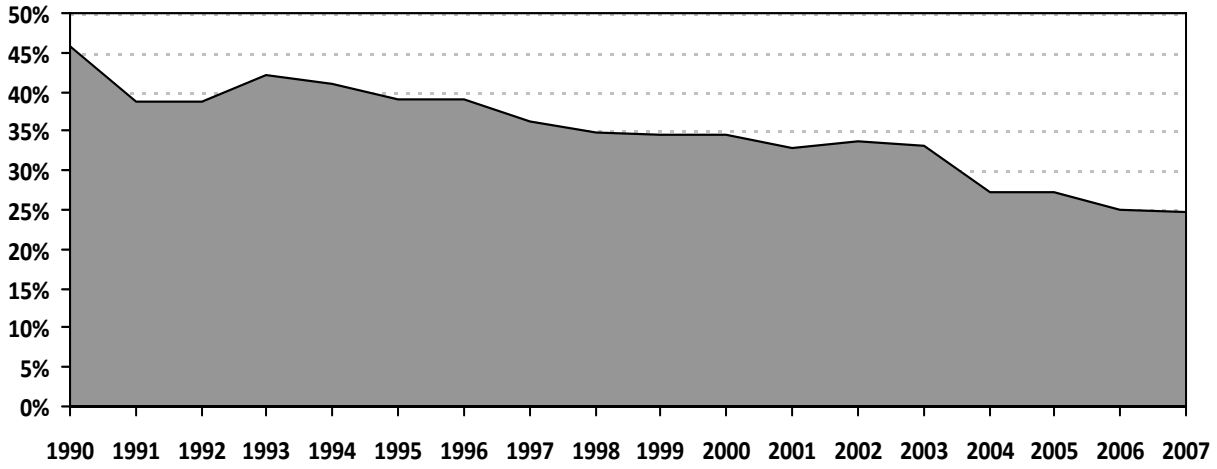
Details of scheduled passenger operations by market and carrier for the regional airports are presented in *Appendix F, Regional Transportation Context*.

Table 4-3 Share of Scheduled Domestic Departures – Logan Airport and the Ten Regional Airports[1]

	2004	2005	2006	2007
Logan Airport, MA	52.4%	49.6%	52.8%	52.2%
Bradley International, CT; Manchester-Boston Regional Airport, NH; T.F. Green Airport, RI	33.9%	35.1%	33.6%	33.5%
Bangor, ME; Pease International Tradeport, NH; Burlington, VT; Hanscom Field, MA; Tweed-New Haven, CT; Worcester Regional, MA; Portland International Jetport, ME	13.7%	15.3%	13.6%	14.3%

Source: The Official Airline Guide.
1 For the peak travel month of August.

Figure 4-4 Share of New England-Originating Flights with New England Destinations



Source: Official Airline Guide. (August for each year.)
Note: Includes all New England airports with scheduled airline service.

Service Developments at Other New England Airports

In addition to Logan Airport and the regional airports discussed thus far, a third tier of airports serves isolated communities or provides niche-commercial airline services in New England.

These airports include: Augusta State Airport, Northern Maine Regional Airport, Bar Harbor Airport, and Rockland Airport, ME; and Hyannis Airport, Martha's Vineyard Airport, and Nantucket Memorial Airport, MA. The third-tier airports support frequent commercial service to Logan Airport and, in some instances, T.F. Green Airport, during the summer months and with less frequency during the winter. Hanscom Field and Pease International Tradeport were not served regularly by commercial passenger airlines until both airports received limited niche-market services in 1999.

Most of these third-tier airports are not in close proximity to Logan Airport or are isolated due to geographic factors. Because of their remoteness and/or limited market areas, these airports are unlikely to attract passengers that now use Logan Airport. Of all these airports, Hanscom Field is the most relevant since it lies within the Greater Boston Metropolitan market served by Logan Airport, and it is operated by Massport. Pease International Tradeport is also noteworthy both because of its proximity to Boston and its airport facilities (see Figure 4-1 for airport locations).

Hanscom Field
Hanscom Field, which Massport owns and operates, continues to play an important role in the regional transportation system as the region's premiere facility for business/corporate GA and as a GA reliever to Logan Airport. Hanscom Field accommodates a variety of GA operations that might otherwise use Logan Airport. In addition to its role as a GA reliever to Logan Airport, Hanscom Field accommodates niche commercial airline services.

In 2007, there were 165,907 aircraft operations at Hanscom Field, more than five times the number of GA operations that occurred at Logan Airport. Aircraft activity at Hanscom Field fell by 3.8 percent compared to 2006, with most of the decrease in GA activity. GA operations accounted for the vast majority (97 percent) of Hanscom Field activity, which fell from 167,560 operations in 2006 to 160,992 in 2007. The decline in total GA activity at Hanscom Field masks an underlying change in the composition of GA activity at the airfield. Operations by business jets, the fastest growing segment of the GA industry, grew by 3.8 percent at Hanscom in 2007, while recreational flying in lighter, single-engine piston aircraft fell by 7.6 percent. In 2007, Hanscom Field accommodated 3,477 commercial airline operations on turboprop aircraft, an increase of 13.7 percent compared to 2006.

Pease International Tradeport
In 2007, there were 39,287 aircraft operations at the Pease International Tradeport, an increase of 4.1 percent from 2006. Passenger volume increased by 98.6 percent from 57,500 in 2006 to 114,000 in 2007 (including both scheduled and charter passengers). The high rate of growth seen at Pease International Tradesport last year was due to the introduction of low-fare Skybus service in May 2007, which increased total scheduled operations at the airport by 64.3 percent and scheduled seats by 121.4 percent, compared to 2006. Meanwhile, Allegiant Airways ceased service to Orlando-Sanford in April 2007.

Regional Airport Improvement Plans

The following section describes significant airport improvements that are planned or under construction at the regional airports.

T.F. Green Airport

Planning for an airport-wide improvement program at T.F. Green Airport in Warwick, RI, including the extension of Runway 5-23, is currently underway. Work on the Draft Environmental Impact Statement (EIS) for the T.F. Green Airport Improvement Program, which began in February 2005, continues. Extending the runway will enable the airport to accommodate demand for long-range non-stop flights to the West Coast. Anticipated safety projects include resurfacing Runway 16-34 and improving the Runway Safety Areas at its runway ends, and demolishing Hangar No. 1 due to an air space penetration. Other improvements include terminal and

concourse expansion, as well as parking and roadway improvements. Because of potential environmental impacts associated with wetlands and community disruption, the FAA determined the need to prepare an EIS for many of the proposed improvements.

One project currently under construction is the Rhode Island Department of Transportation's (RIDOT) $222 million intermodal transportation hub near T.F. Green Airport. The Warwick Intermodal Facility, scheduled to open for train service in mid 2010, will include a commuter rail station served by Massachusetts Bay Transportation Authority (MBTA), a new consolidated rental car facility, a bus station for both local Providence-area buses and intercity buses, and commercial parking. The station will be directly connected to the airport terminal by an elevated skywalk.

Manchester-Boston Regional Airport

Over the past decade, over $500 million was invested in Manchester-Boston Regional Airport to improve and develop landside and airside facilities and infrastructure. Projects included a 158,000 square foot passenger terminal, two 75,000 square foot terminal additions, a 4,800 space parking garage with an elevated pedestrian walkway connection to the terminal, roadway improvements, and extensive runway reconstruction and lengthening.

To date, the airport has completed the majority of the short-term, mid-term and long-term projects contained in its 1997 Master Plan Update. Manchester-Boston Regional Airport is in the process of updating its Master Plan. Improvements to be completed over the next several years include:

- Reconstruction of Runway 06 and safety area improvements
- Construction of a glycol collection/treatment facility
- Construction of a three-gate North End Terminal Expansion
- Construction of Parking Lot G and expansion of Parking Lot C

Bradley International Airport

Work was completed on the Master Plan Update at Bradley International Airport in 2004. The Master Plan Update was originally initiated in 2000 and was revised after September 11, 2001 to incorporate anticipated industry-wide developments and the future aviation and security requirements at the airport.

Work on the specific projects discussed in the Master Plan Update began in 2005. The refurbished and expanded Terminal A with an additional 260,000 square feet has opened; the project added a concourse, 12 new gates, and a state-of-the-art security and communications system. Further construction projects expected to be completed in 2008 include raising the roof of the existing terminal and relocating the secondary security checkpoint.

The New England Regional System Plan (NERASP) Study (which is discussed later in this chapter) cited the following as potential future capital improvements for Bradley International Airport:

- Rehabilitation of Taxiways E and T
- Installation of Runway 33 Precision Approach Path Indicator

- Purchase of noise monitoring equipment and implementation of noise abatement plan

Hanscom Field

Massport has planned several landside and airside improvements at Hanscom Field, which are described in detail in the *Hanscom 2005 Environmental Status and Planning Report* and the annual report on *The State of Hanscom*. On the landside, the planned improvements include the redevelopment of Hangar 24; renovations of the first floor, roof, and building of the Civil Air Terminal are also planned, with designs expected to incorporate plans to support commuter airline operations more effectively and efficiently. Airside improvements include enhancements of runway safety areas, ongoing approach and departure surface vegetation management, East Ramp improvements, and reconstruction of Taxiways E and M. Some longer-term potential improvements, which are expected but have not been formally planned and may change in response to market conditions, include rehabilitation of Taxiways G and M, paving the perimeter surface roads, and improvements in landside road areas.

Worcester Regional Airport

Since February 1995, Massport has been working with the City of Worcester to identify various tasks and opportunities for increasing the utilization of Worcester Regional Airport in order to accommodate a portion of the regional demand that would otherwise utilize Logan Airport. In January 2000, Massport assumed operating responsibility for Worcester Regional Airport and in 2003, the FAA and Massachusetts Aeronautics Commission (MAC) funded a Master Plan which is intended as a strategic roadmap to guide development of the airport through 2020. The findings and recommendations of the Worcester Regional Airport Master Plan were announced in December 2007. Also in 2007, Massport contributed approximately $1,400, 000 to the operational expenses of the airport.

Worcester Regional Airport is recognized as an important aviation resource with a forecast future of corporate/GA activity and target commercial service. The Master Plan incorporated aviation forecasts from the NERASP Study and recommended near and long-term development actions. Near-term projects will focus on essential facility maintenance and security and include runway pavement and Runway Safety Areas projects, a vegetation management plan, and ground access improvements. In addition to essential airfield infrastructure maintenance, other long-term initiatives, such as terminal enhancements, will be demand-driven according to the level and type of aviation activity realized.

Initiatives in Support of Regional Alternatives

Massport advocates a regional transportation policy to improve the efficient use of the region's transportation infrastructure by appropriate expanded use of regional airports and alternative transportation modes. To achieve this policy goal, Massport is committed to cooperative transportation planning and is working actively with a broad array of transportation agencies and concerned parties to promote an integrated, multi-modal regional transportation network. Massport has undertaken several initiatives to advance a strong network of commercial service airports in the New England region. Ultimately, air service decisions rest with the air carriers and are driven by airlines' economics and business strategies.

Massport participates in several interagency transportation planning forums pertaining to alternative, intercity travel modes. Previous filings described past initiatives and cooperative planning ventures. The following section describes Massport's most recent initiatives.

Massport's Cooperative Planning Efforts

A balanced regional intermodal transportation network would reduce reliance on Logan Airport as the region's primary transportation hub, and provide New England travelers with a greater range of viable transportation options. Regional airports have emerged as economic and transportation centers within the communities that they serve. If this role were enhanced, this would reduce the dependence on intraregional automobile trips and on Logan Airport as the beginning, destination, or connecting point for air passengers.

As a result of the 1999 Regional Transportation Summit, Massachusetts and other New England states developed agreements to expand and improve regional transportation between the states by increasing rail services and evaluating transportation needs and impacts. In December 2000, a second annual Summit was held to discuss regional transportation issues and infrastructure development, use, and efficiency. An outcome of this summit included the proposal to re-establish the New England Governors Conference Committee on Transportation as a regular forum for further discussion of regional transportation initiatives.

The Council of New England Governors and other policy decision makers throughout the region will be able to utilize strategies and information developed in the NERASP Study, which provides a framework for integrated regional aviation policy and planning.

In March 2001, the New England Governors adopted a resolution to coordinate and implement regional transportation planning across the six New England states. The formal resolution created the Regional Transportation Coordinating Council (RTCC) to work with the FAA to study and increase regional airport use. The RTCC meets quarterly and consists of twelve members, with each governor appointing two members. The mission of the RTCC is to encourage federal transportation agencies to participate in the planning and funding of regional initiatives aimed at building and enhancing regional transportation infrastructure. RTCC efforts have been folded into the NERASP Study.

New England Regional Aviation System Plan Study

On April 14, 2000, the FAA and the regional airport directors undertook the NERASP Study. Massport, contributing 5 percent of the study funds, was the contract administrator for this FAA study. The overall objective of the NERASP Study was to identify strategies for optimizing New England's regional airport system. The Study was conducted in two phases. Phase I of the Study began in 2002 and was completed in 2004. Phase 2 began in 2005, and the NERASP Study final report was released in October 2006.

The NERASP Study determined that airport proximity is the principal factor that passengers consider when selecting an airport if multiple airports are convenient to the passenger. However, passengers do actively choose airports that may be farther away from their ground origin or destination if those airports offer better air services, such as nonstop flights to international or transcontinental destinations, or lower airfares.

The Study identified and documented that there is a high degree of cross-airport utilization within the Greater Boston airport system: Logan, T.F. Green, and Manchester-Boston Airports. In effect, the three airports act as a

system of airports, with significant numbers of passengers choosing the most convenient airport in terms of access, airfares, and available air services depending on their individual air travel needs.

Regional Rail Transportation Initiatives

This section reports on the Downeaster and Northeast Corridor rail services, and the Pilgrim Partnership. The Downeaster rail service operates along a 115-mile corridor between Boston-North Station and Portland, Maine. The service is operated by Amtrak under contract to the Northern New England Passenger Rail Authority (NNEPRA). The Downeaster currently makes five daily round trips between Portland and Boston, with a one-way trip time of 2.5 hours. The Downeaster currently serves a total of ten passenger stations, including Boston-North Station, Anderson Transportation Center (Woburn) and Haverhill in Massachusetts; Exeter, Durham, and Dover in New Hampshire; and Wells, Saco, Old Orchard Beach (seasonal service) and Portland, Maine. Funding for the capital and operating needs of the service is provided by the State of Maine through NNEPRA. Approximately 346,000 one-way trips were taken on the Downeaster in Fiscal Year 2007, the most since service began in 2001 and an increase of 5 percent over the 329,000 one-way trips taken in Fiscal Year 2006. As of December 2007, average revenue per passenger was $14. Many passengers travel on passes, which results in a reduced average fare.

Amtrak's Northeast Corridor is an intercity rail service that operates between Boston-South Station and Washington, DC via New York City. Other major destinations served by the route include Providence, RI; New Haven, CT; Philadelphia, PA; and Baltimore, MD. The Northeast Corridor is the mostly heavily used intercity rail corridor, and offers the highest level of service, in the U.S. Amtrak operates two distinct services between Boston and Washington, DC along the corridor: the Acela Express, its high-speed, limited-stop service that was inaugurated in the year 2000; and the Acela Regional, a lower-speed service that makes local stops along the route. Travel times on the Acela Express range from 3.5 hours from Boston to New York to just over 6.5 hours from Boston to Washington, DC. Travel times on the Acela Regional range from about 4 ¼ hours from Boston to New York to approximately 7 ¾ hours from Boston to Washington, DC. A total of 19 daily departures are offered from Boston-South Station to Penn Station in New York, of which about half are Acela Express. Most of these trips continue south to Washington, DC, and a smaller number continue further south to Newport News, Virginia. System-wide Amtrak ridership was 25.8 million one-way trips in Fiscal Year 2007. The Northeast Corridor represented 39 percent of total annual Amtrak ridership, or about 10 million passenger trips. Amtrak captures approximately 41 percent of the total air/rail market between Boston and New York, up from 18 percent before Acela service was introduced.[3]

The Pilgrim Partnership is an arrangement between the MBTA and RIDOT, under which RIDOT allocates some of its federal funding to the MBTA in return for commuter rail service to Boston from RI. The MBTA Commuter Rail currently reaches Providence, and plans are in place for service to Pawtucket, Wickford, South County, and T.F. Green Airport in Warwick, RI. Commuter rail service could potentially attract more passengers from the Boston area to T.F. Green Airport. Service to Warwick and Wickford is expected to commence mid-2010.

3 Air/Rail Statistics; Amtrak Market Research and Pricing; February 4, 2008.

Other Cooperative Regional Transportation Planning and Operation Efforts

Massport participates in the following regional transportation planning efforts:

- Massport is active in Fly New England, a cooperative marketing association that advocates the use of New England's regional airports. Fly New England participating airports include Burlington, Portland, Bradley International, Manchester-Boston Regional, T.F. Green, Logan, and Worcester Regional Airports.
- Massport supports intercity rail planning through its membership and participation in the Boston Metropolitan Planning Organization (MPO). The MPO is a cooperative planning board that consists of these state and regional agencies: Executive Office of Transportation, MassHighway, Metropolitan Area Planning Council, MBTA, and the MBTA Advisory Board. Several municipal governments also participate in the MPO process, including the cities of Boston, Everett, Newton, and Salem, and the towns of Bedford, Hopkinton, and Framingham.
- In 2007, Massport, together with nine other state transportation agencies, joined as a member of the Massachusetts Mobility Compact. The Mobility Compact was created by Governor Deval Patrick to improve the delivery of transportation services in Massachusetts by enhancing communication and cooperation among the state's transportation agencies in the planning, design, construction, and operation of transportation services.
- Massport periodically participates in meetings of other regional and state aviation organizations and the Massachusetts Aeronautics Commissions.

Massport also cooperates with other transportation agencies to promote transit operations. Information on Massport's cooperation with other transportation agencies in relation to transportation planning and operations is provided in *Chapter 5, Ground Transportation*. Chapter 5 also provides information on transit ridership, and the status of ground transportation improvements at, and in the vicinity of, Logan Airport.

5
Ground Transportation

Introduction

Massport's ground transportation goal is to provide a diverse range of ground access options for air passengers, Airport employees, and other Airport users. Massport accomplishes this by promoting ridership on high occupancy vehicles (HOVs), reducing reliance on single occupant vehicles (SOVs), and maintaining and enhancing efficient transportation access and parking options in and around Logan Airport. Since the early 1980s, Massport has been a leader in the development, promotion, and use of alternative means of ground transportation for access to and from Logan Airport. By providing a diverse range of environmentally responsible alternatives to travelers, employees and other Airport users, reliance on SOVs has diminished, reducing traffic congestion and improving air quality.

Over recent years, Massport has implemented extensive roadway improvements at the Airport in conjunction with Mass Highway's Central Artery/Tunnel (CA/T) and Logan Airport modernization projects. In 2007, Massport completed the Central Garage expansion (Phase II of the West Garage Project). Figure 5-1 presents the roadway infrastructure at Logan Airport in 2007.

This chapter describes existing ground transportation options, ridership levels, parking, and traffic conditions at Logan Airport during 2007. A historical comparison of ridership levels is provided from 2004 (the most recent Environmental Status and Planning Report (ESPR) year) through 2007. A complete historical list, dating to 1990, is provided in *Appendix G, Ground Transportation*. In 2006, with the closing of Interstate 90 access to the Airport for tunnel ceiling repairs, traffic volume data collection was suspended and ridership levels on other transportation modes saw short-term increases which may have been related to the closure. The following sections focus on ground transportation conditions in 2007 including:

- Ground access modes, services, and ridership for air passengers, visitors and employees
- Transportation demand management measures implemented by the Logan Employee Transportation Management Association (Logan TMA)
- Logan Airport 2007 Air Passenger Survey
- Logan Airport 2007 Employee Survey
- Parking supply, demand, duration, and cost
- Ground access planning and management

Key Findings

Ground transportation and access highlights for 2007 include:

- Ground transportation activity levels increased for all modes from 2006 to 2007 as a result of a 1.4 percent increase in the number of air passengers, as described in *Chapter 2, Activity Levels*.
- The re-opening of Interstate 90[1] connecting the City of Boston and areas to the south and west of Boston to Logan Airport resulted in increased traffic flows to and from the Airport when compared to previous levels.
- Traffic volumes on airport roadways increased by 4.4 percent from 2005 to 2007 while VMT (vehicle miles traveled) increased by 10.4 percent. The greater increase in VMT was largely due to the change in the distribution of traffic volumes at the gateways. The analysis compares 2007 data with 2005 data, since Interstate 90 tunnel closures in 2006 forced many passengers to seek alternate routes of travel to the Airport.
- Ridership comparisons for the various transportation options are measured against 2005 ridership levels. (In 2006, ridership levels on most HOV services increased due to the temporary closure of Interstate 90. Comparison of 2007 against 2005 therefore provides a more accurate trend analysis.) In 2007, ridership on water transportation increased by 102 percent, and scheduled and unscheduled HOV services increased by 15.8 percent for limousines and 8.8 percent for taxis.
- From 1990 to 2007, the Airport has seen a doubling in the number of employees who commute to work via HOV or alternative means of transportation. During this time, the drive alone mode share has decreased from 83.8 percent in 1990 to 68.5 percent today. Between 2001 and 2007, there was a 4.8 percent decrease in the drive alone mode share. Transit services, particularly Logan Express, have seen substantial increases in employee use.
- Employee ridership on Logan Express increased by 1.7 percent when compared to 2005 levels. Between 2001 and 2007, overall employee HOV ridership grew from 27 to 32 percent.
- Passenger ridership on Logan Express decreased by 4.8 percent in 2007 compared to 2005.
- MBTA's (Massachusetts Bay Transportation Authority) automated fare system using the Charlie Card was fully implemented on January 1, 2007, eliminating the use of tokens entirely.
- In 2007, the Logan TMA introduced and implemented three new programs: 1) Sunrise Shuttle, which provides shuttle services between 3:00 AM and 5:30 AM for Airport employees who reside in East Boston; 2) Logan TMA Preferential Carpooling, which provides free terminal garage parking to employees of Logan TMA member companies who carpool in groups of three or more; and 3) the Commuter Cash program, which financially rewards employees ($3/day) who switch from driving alone to either carpooling, bicycling, walking, or using public transportation.
- The number of on-Airport parkers decreased by 16.9 percent in 2007 compared to 2005. A portion of this decrease is likely due to the increase of passenger pick-up and drop-off at the Airport. Parking supply remained within the Logan Airport Parking Freeze Limits at all times.

2007 Ridership and Trends

Passengers and employees access Logan Airport using many HOV transportation modes, including: 1) public transit (MBTA) rapid transit, Silver Line Bus Rapid Transit (BRT), bus, and water transportation; 2) Logan

1 In 2006, a tunnel collapse lead to the closing of Interstate 90 forcing many passengers to seek alternate routes of travel to the Airport.

Express bus service; 3) scheduled buses and vans (including Logan Direct bus service); and 4) unscheduled private limousines and vans. Additional ground access to Logan Airport is provided by modes categorized as non-HOV including private automobile, taxi, and rental car. The following sections provide an overview of public transportation services available to Logan Airport users and documents current ridership levels and historic trends. Figure 5-2 illustrates the public transportation access options for travel to and from Logan Airport.

Figure 5-1 Logan International Airport 2007 Roadway Network

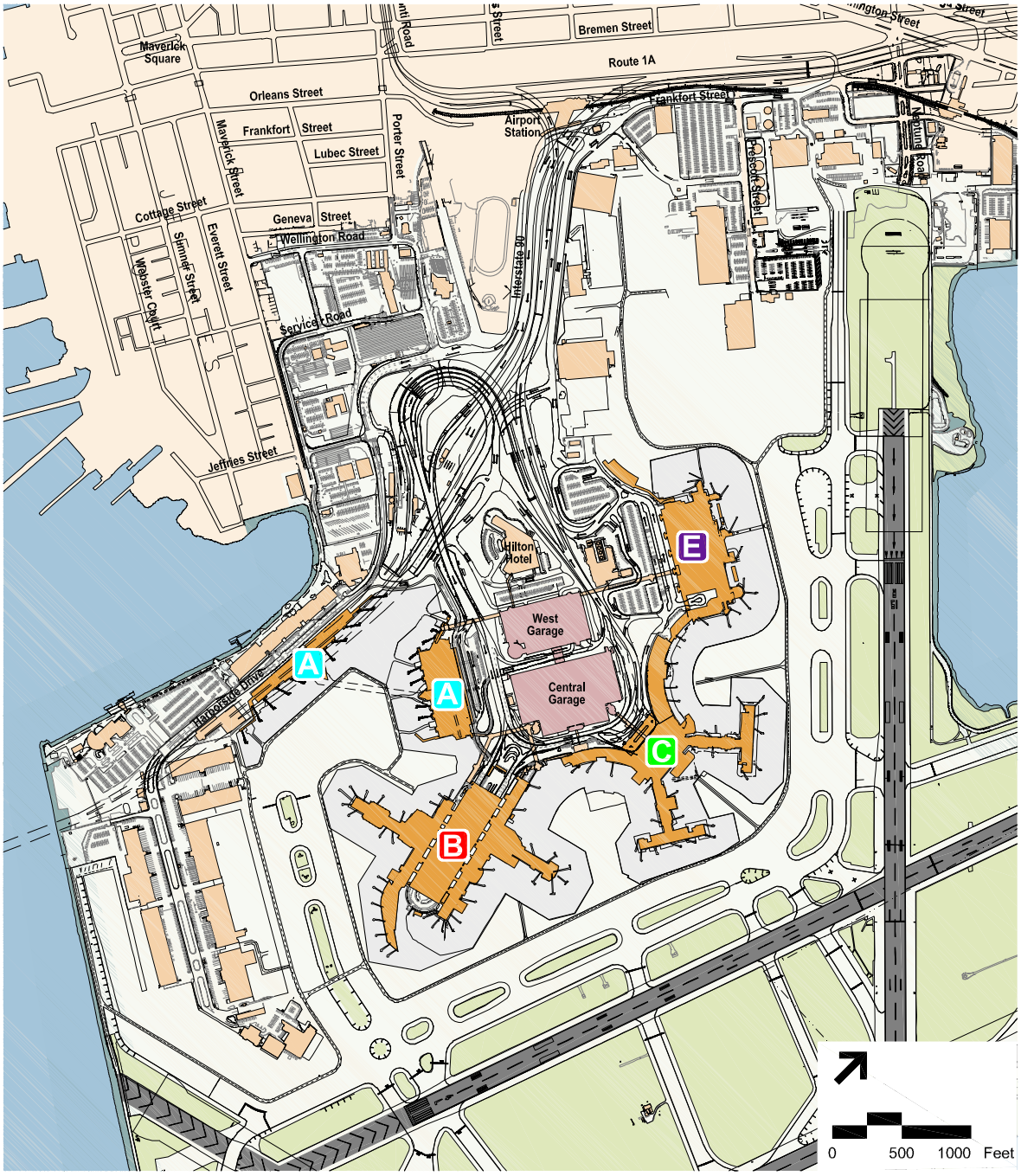
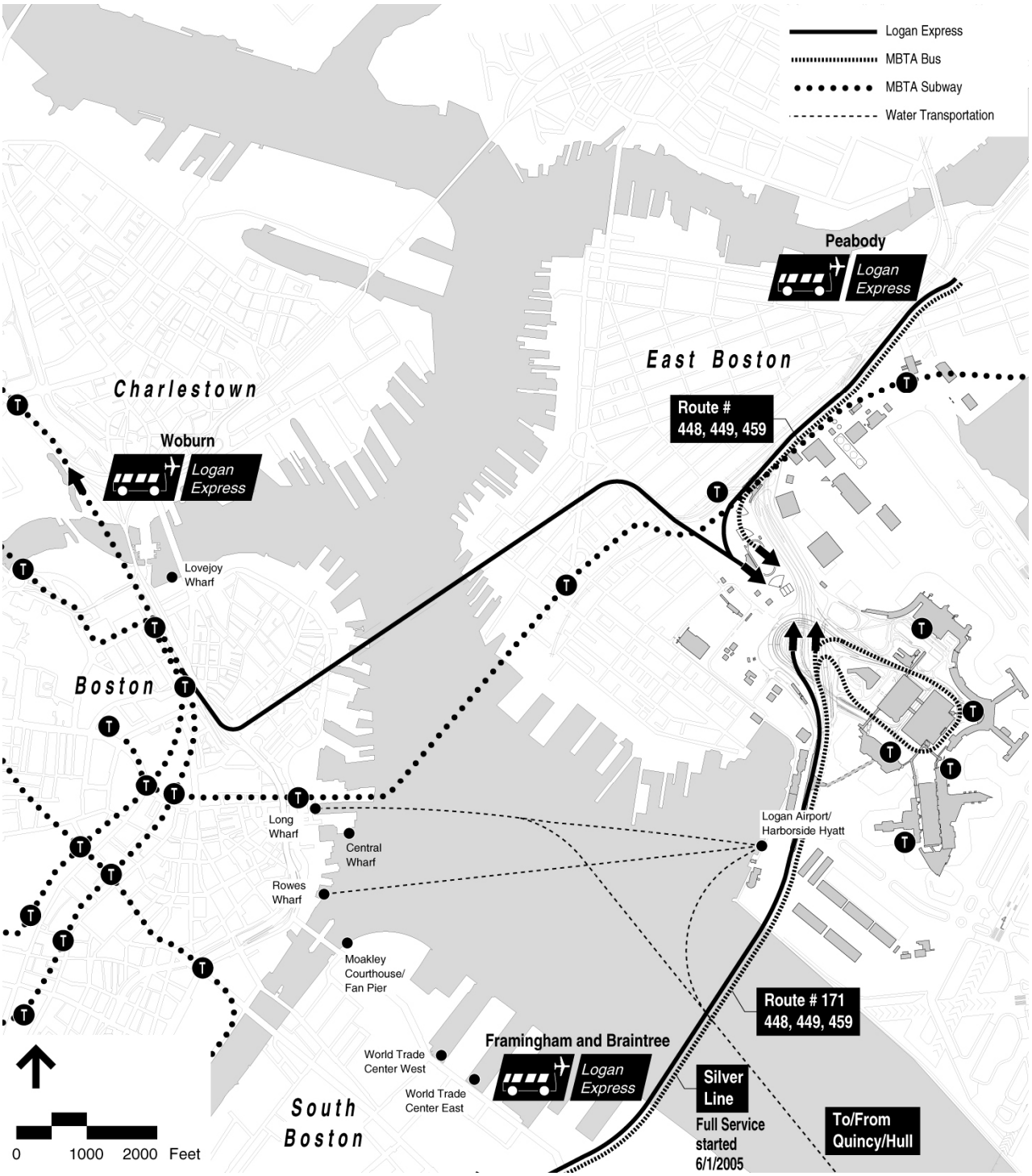


Figure 5-2 Logan Airport - Public Transportation Options



Ground Access Services

Massport is committed to a long-term goal to promote and support public and private HOV services aimed at serving air passengers, Airport users and employees. While private automobiles, taxis, and rental cars often carry multiple occupants, they are not categorized as HOV modes.

For 2007, available ridership data and an update on the status of each HOV and non-HOV mode are provided below. Ridership levels for Logan Airport public transportation modes are summarized in Table 5-1. To present a more accurate trend analysis, the analysis compares 2007 data with 2005 data, since Interstate 90 tunnel closures in 2006 forced many passengers to seek alternate routes of travel to the Airport. With part of the metropolitan transportation system closed, a comparison to 2006 would provide an inaccurate trend analysis because of the higher use of alternative modes of transportation in 2006.

Determination of Logan Airport's mode share (the percent of air passengers using a particular mode to access Logan Airport) is based on the results of periodic passenger surveys. While the ridership information presented in this *2007 EDR* provides a status report on 2007 conditions, it cannot be used to determine mode shares for individual modes or for passengers or employees separately because the data do not discern between passengers or employees. Moreover, non-Airport patrons, such as East Boston residents and car rental patrons are included in the ridership data.

The Logan Airport 2007 Air Passenger Survey revealed a 27.8 percent HOV mode share serving 28.1 million air passengers, down from 30.3 percent HOV mode share serving 26.1 million passengers in 2004 when the last passenger survey was concluded. An employee survey was conducted in 2007. The results of both surveys are documented later in this chapter.

Table 5-1 Reported Logan Airport Passenger Ridership Levels

	MBTA		Logan Express Bus		Scheduled and Unscheduled HOV			
Year	MBTA Blue Line	Silver Line	Air Passengers	Airport Employees	Water Transportation[1]	Van/ Buses[2]	Limousines[3]	Taxi Pool Dispatches
2004	2,740,372	NS	857,530	408,297	112,493	761,320	1,448,581	1,710,000
2005	NA	254,608[4]	837,530	397,660	50,000[5]	701,500	1,250,180	1,769,880
2006	NA	642,177	891,918	418,051	115,113	775,640	1,591,361	1,864,238
2007	2,524,079	677,212	797,530	404,222	101,008	NA	1,448,060	1,925,817
Percent Change (2005-2007)[6]	--	166.0%[4]	(4.7%)	1.7%	103%	--	15.8%	8.8%

NA Not available.
NS Not in service.
1 Includes City Water Taxi, Rowes Wharf Water Transport, Boston Harbor Water Taxi and MBTA Harbor Express.
2 Includes outbound passengers only on services offered by bus or van lines and hotels on a pre-determined schedule and route.
3 Limousines include outbound passengers only.
4 Service began June 1, 2005; ridership for seven month period only. Therefore percent change is not necessarily an indication of increased ridership.
5 Water transportation ridership was down in 2005. This reflects a downward trend in water transportation ridership that began with the opening of the Ted Williams Tunnel in the mid-1990s. As a result of the improved tunnel access, many former water transportation users utilized ground taxi service or Silver Line service between the Airport and downtown Boston. In 2005, available water transportation services decreased from four companies to two.
6 Comparison made to 2005 since 2006 was an anomalous year due to the forced closure of Interstate 90 tunnel for repairs.

Rapid Transit

The MBTA provides direct connections to Logan Airport via the Blue Line at the new Airport Station and via the Silver Line to each of the terminals. Since 1990, the MBTA Blue Line ridership at Airport Station has varied between 2,500,000 and 3,100,000 annual riders. This relatively stable ridership in light of the increased air passenger activity over the years is partially attributable to increased use of other public transportation modes such as the Logan Express bus service, the Silver Line, and scheduled vans, buses, and limousines. Ridership on the Silver and Blue Lines is discussed in more detail below.

Silver Line Ridership

The Silver Line is a rapid bus transit service that serves South Station, South Boston, and Logan Airport. The Silver Line to Logan Airport provides a direct connection between the Red Line and Southside Commuter Rail services at South Station and the Airport terminals via the South Boston Transitway and the Ted Williams Tunnel (TWT). Full Silver Line service to Logan Airport began on June 1, 2005. Service operates on 10 to 15 minute headways on weekdays between 5:50 AM and 1:00 AM and serves Terminals A through E at dedicated bus stops. Off-peak and weekend service operates on 12 minute headways. More frequent service is provided during periods of particularly high demand, such as during holidays or large conventions at the Boston Convention and Exposition Center.



Silver Line Bus Service between Logan Airport and South Station

As shown in Table 5-1, Silver Line ridership continues to increase to/from the Airport via South Station and the waterfront. The Silver Line is the only rapid transit service that provides a one-seat connection to each terminal directly from South Station (and stops in Boston near the Boston Harbor waterfront). The Blue Line requires a second-seat ride on a Massport shuttle to connect riders to terminals. The 2007 ridership data indicate that a portion of Silver Line ridership may reflect passenger diversion from the Blue Line to the Silver Line. However, since Blue Line data were not available in 2005 or 2006, no direct comparison can be made.

Blue Line Ridership
Blue Line ridership information indicated that there were 2,524,079 riders at Airport station in 2007. Although ridership data for 2005 and 2006 are not available for comparison, the ridership has been fairly consistent over the past 17 years.

On January 1, 2007, the Charlie Card fare payment system was fully implemented. This automated payment system replaced subway token use and provided more convenient fare collection and improved customer service. As of April 2007, approximately 1.4 million fare cards were issued, of which about 858,000 showed active use. By the end of 2007, more than 2.5 million Charlie Cards were issued.



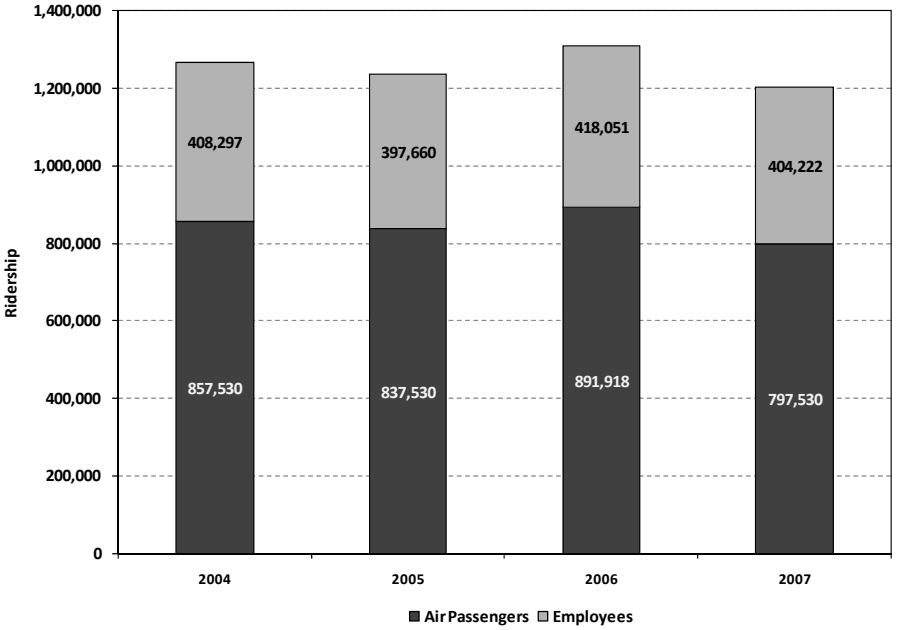
One of 13 Charlie Card machines available in Logan Airport

Logan Express Bus Service
Massport offers frequent express bus service to Logan Airport for air passengers and Logan Airport employees from Braintree, Peabody, Framingham, and Woburn. Full service bus terminals and secure parking are provided at all four locations. The fares for a round-trip adult fare increased slightly from $20 in 2006 to $22 in 2007; reduced fares are offered to seniors, and children under the age of 12 ride free with an adult. Parking rates remain the same as 2006 at $11 per day. On weekdays and Sundays, half-hour headways are provided from the Braintree, Woburn, and Framingham locations. One-hour headways are provided at all times at the Peabody location and at all locations on Saturdays.

Logan Express ridership trends are shown on Figure 5.3 and Table 5.1. When compared to 2005, air passenger ridership on Logan Express continued to decrease in 2007, which could partially be attributed to better roadway access to the Airport via Interstate 90. Employee ridership on Logan Express increased by 1.7 percent in 2007 when compared to 2005. Logan Express bus ridership has not yet returned to year 2000 or pre-September 11, 2001 levels for air passengers. As described in the *2004 ESPR*, despite continued targeted marketing in the potential service area, ridership on the Peabody Logan Express remains well below that of the other Logan Express services. Massport continues to evaluate that facility and consider more cost-effective options for servicing that market. A detailed breakdown of the Logan Express ridership is presented in *Appendix G, Ground Transportation.* To promote HOV ridership, Massport has an extensive outreach campaign for Logan Express services including placing advertisements in local newspapers such as the Boston Globe North and

South Zones, Quincy Patriot Ledger, North Shore Sunday, Woburn Daily News, Stoneham Independent, www.boston.com, and the Metro Shadow Radio.

Figure 5-3 Logan Express Bus Ridership

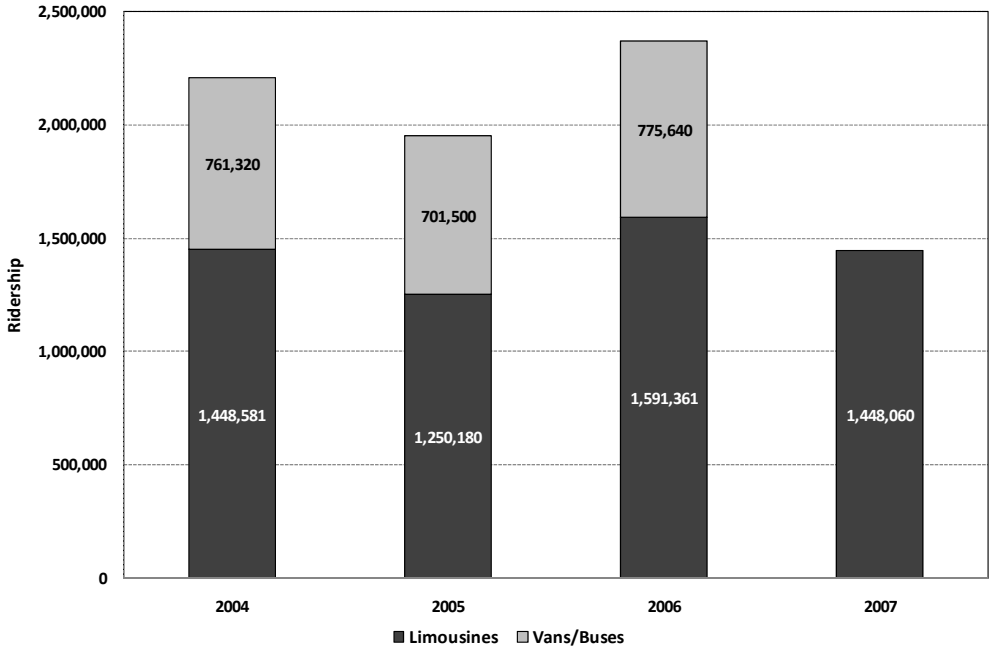


Vans, Buses, and Limousines

Massport continues to support the use of privately operated vans, buses, and limousine services by providing designated curb areas at all terminals. Shared van services include service between Logan Airport and many hotels in the Greater Boston area. Shared vans also provide service from western Massachusetts and other regional points throughout New England. Massport offers a 50 percent discount on the ground access fees for alternative fuel vehicles (AFV) that uses compressed natural gas (CNG) or are powered by electricity. An inventory of Massport's alternative vehicle fleet is presented in Table 7-11 of *Chapter 7, Air Quality/Emissions Reduction.*

The majority of scheduled HOV carriers (including Logan Direct and privately operated services to and from South Station by Plymouth/Brockton and Bonanza bus lines) use a combination of 15- to 40-passenger vehicles and over 40-passenger buses. Ridership data from the various van and bus companies were not made available to Massport for 2007. As shown in Table 5-1 and Figure 5-4, use of limousines increased by 15.8 percent in 2007.

Figure 5-4 Limousine and Van/Bus Ridership[1]



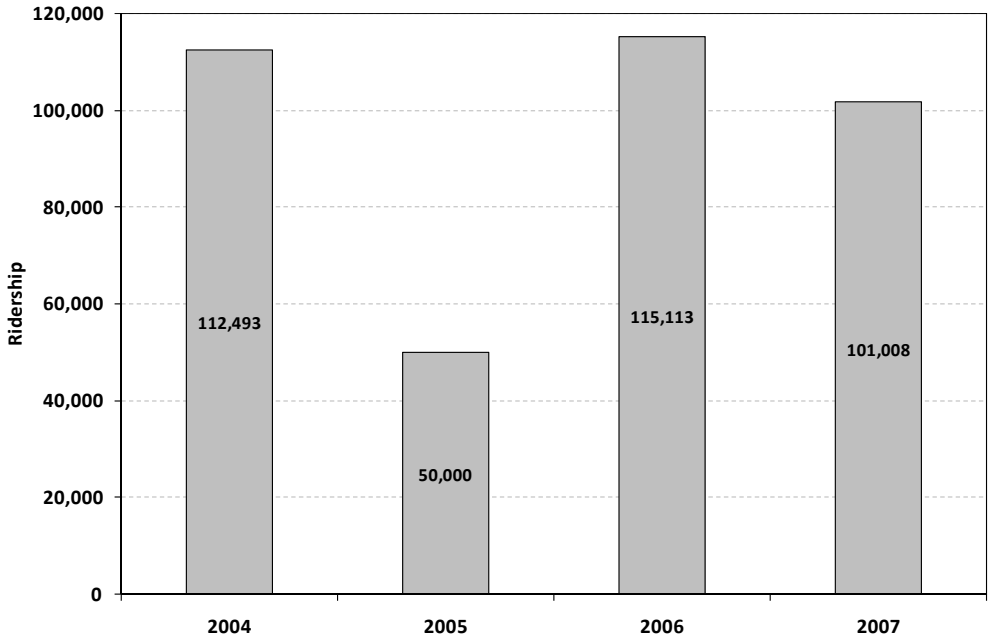
1 Van/bus ridership not available for 2007.

Water Transportation

Four companies provide water transportation within the Boston area: City Water Taxi, Rowes Wharf Water Shuttle, MBTA Harbor Express, and Boston Harbor Water Taxi. Collectively, these companies serve numerous destinations throughout Boston Inner Harbor. The water taxi landings include Long, Rowes, and Central Wharfs, the World Trade Center and the Moakley Courthouse in South Boston, Lovejoy Wharf near North Station, and stops in the North End, Charlestown, Chelsea, and East Boston. Massport provides courtesy CNG-powered bus service between the Logan Airport dock and all Airport terminals.

The ridership declined in 2005 because of the loss of two of four water transportation companies. Since the implementation of additional water transportation services, ridership has improved substantially. Ridership on water transportation has doubled since 2005, to 101,008 annual riders in 2007. Ridership increases in 2006 were partially attributable to the temporary Interstate 90 tunnel closure.

Figure 5-5 Water Transportation Ridership

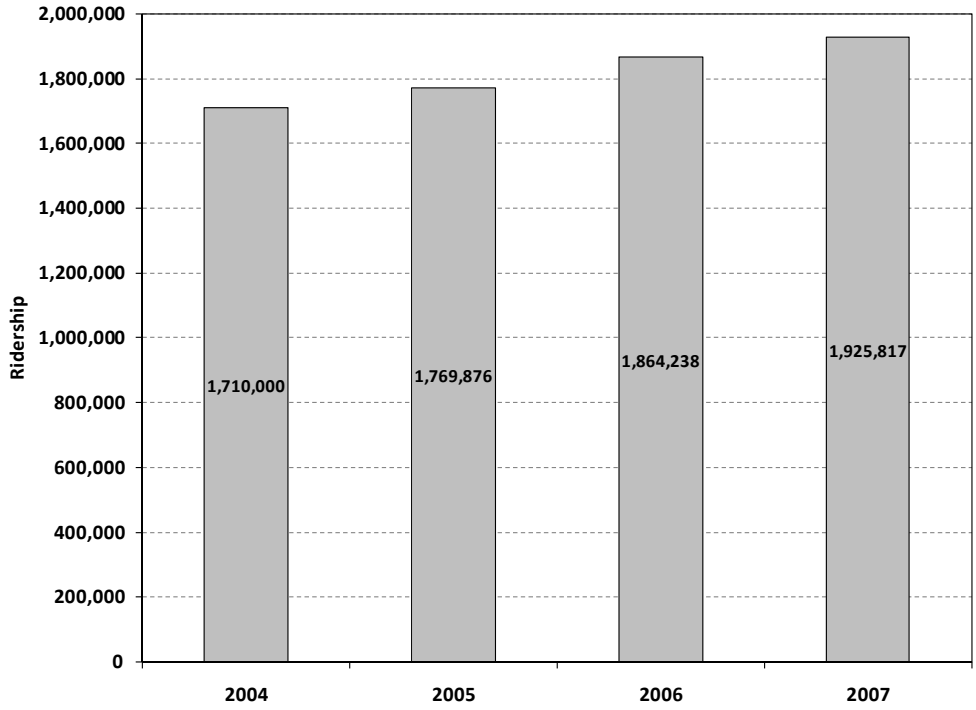


Automobile Access
Logan Airport patrons can access the Airport by a number of automobile modes, including: drop-off and pick-up by private automobile; driving to Logan Airport and parking; taxis; and rental cars. Although these modes are categorized as non-HOV, they frequently carry more than one passenger per vehicle. Air passenger survey results for a 2007 estimated average vehicle occupancy of 2.3 for these modes.

Taxis
Taxi ridership trends are reflected in the total number of taxis dispatched from Logan Airport (serving outbound passengers). As shown in Table 5-1 and Figure 5-6, the total number of taxis dispatched in 2007 was 1.93 million, an 8.8 percent increase from 2005. Even considering this increase, taxi ridership to Logan Airport has still not returned to the highest recorded levels (2000).

The available taxi data only reports dispatches from Logan Airport. The data do not include suburban or city taxis that drop passengers at Logan Airport and drive back empty to where they originated (because they are not authorized to pick up passengers at Logan Airport).

Figure 5-6 Taxi Dispatches



Southwest Service Area (SWSA) Redevelopment Project

As described in the ESPRs and EDRs dating back to 1993, Massport has been engaged in ongoing feasibility studies to replace and upgrade existing car rental and ground transportation facilities in the Southwest Service Area (SWSA). In early 2006, Massport initiated a feasibility study for a consolidated rental car facility to be located in the SWSA. The study examined site layout and access alternatives, financing options, order of magnitude costs, and environmental benefits. The proposed SWSA Redevelopment Program is a continuation of Massport's ongoing commitment to create customer efficient facilities at Logan Airport in an environmentally responsible manner while reducing impacts to the community. Logan Airport's SWSA currently supports a variety of essential ground transportation services and facilities including the airport's taxi pool, six separate rental car businesses, the bus/limousine pool, and a flight kitchen.

Currently, eight rental car agencies serve Logan Airport. Six companies (Hertz, Avis, Budget, Alamo, Dollar and National) are located on-airport in the SWSA. Two rental car agencies (Enterprise and Thrifty) operate on Route 1A north of the Airport, with Enterprise expected to move on-airport in 2008 and Thrifty to relocate to the airport with the proposed consolidated car rental facility. Each rental car agency operates its own diesel-fueled shuttle bus fleet that runs between all terminals and their respective on or off-airport facilities.

The SWSA Redevelopment Program would consolidate on-airport rental car operations and facilities into one integrated facility (ConRAC) in order to better serve both the tenants and the traveling public, to reduce ground transportation and air quality impacts on-airport and in the surrounding neighborhoods, and to reduce associated off-airport impacts. The SWSA Redevelopment Program also includes a commercial parking

component, which would improve management of the parking supply on the airport. The proposed commercial parking will fully comply with the Logan Airport Parking Freeze. Redevelopment of the SWSA is needed because under current conditions and projected future passenger growth (independent of the project), the SWSA and rental car facilities as they operate today are not adequate to meet Massport's or the rental car companies' future needs.

The proposed SWSA Redevelopment Program replaces and upgrades existing uses within the SWSA. The development includes a five-level, approximately 2.8 million square foot garage to accommodate rental car storage and up to 3,000 commercial parking spaces. In addition, approximately 270,000 gross square feet of support facilities for the car rental operations (customer service center and quick turnaround areas), a common bus system, a reconfigured taxi pool, and roadway improvements are also proposed.

The SWSA Redevelopment Program will implement improved environmental management, provide landscaped edge buffers including the continuation of the Logan Airport Edge-Buffer Program and reduce noise for adjacent neighborhoods. Phase I of the edge buffer in the SWSA is a landscaped buffer along the existing noise wall that parallels Maverick Street, which replaced and upgraded the Maverick Street Gate. The existing 18-foot wall helps screen the Jeffries Point neighborhood from Airport related visual and noise impacts. Phase II of the SWSA Edge Buffer will be integrated with the redevelopment of the SWSA through a combination of landscaping (i.e., densely planted or planted on earth berms for enhanced separation) solid barriers such as fences and walls. The garage structure itself will act as a noise and visual buffer to existing roadway ramps and aviation activity from the neighborhood.

If the ConRAC is not built, the rental car agencies will have no choice but to expand their existing off-site facilities in the adjacent residential communities, thus adding to the roadway congestion and a further air quality deterioration in the region. In an effort to avoid the consequences of not addressing current rental car conditions, Massport's goal is to provide better rental car facilities in a more efficient way through a comprehensive, on-airport plan within the SWSA.

The proposed ConRAC and its associated program elements will offer significant environmental and operational benefits including:

- Reducing or eliminating the need for the rental car operators to shuttle vehicles from off-airport storage locations reducing the impact (reduction in VMTs and emissions) of rental car operations on the East Boston community, Route 1A, and adjacent neighborhoods.
- Designing, constructing and operating the ConRAC in order to be eligible for LEED® certification (strive to achieve a LEED Silver rating and the State of Massachusetts LEED-Plus program).
- Reducing motor vehicle emissions from the consolidated shuttle bus system, which will be powered by a fleet of low-emission, clean-fuel vehicles. The consolidated shuttle bus system will also reduce congestion, terminal curb demand, and dwell times at terminal curbs.
- Halving the number of the current rental car shuttle bus fleet of approximately 100 vehicles (peak) to approximately 40 to 50 vehicles (peak) with a subsequent reduction in VMT and emissions.
- Facilitating the design and implementation of a landscaped buffer system surrounding the new facility (SWSA Edge Buffer, Phase 2).
- Providing pedestrian and bicycle accommodations.

- Reducing noise from existing rental car operations; and buffering the community from noise from the airport roadway system.
- Improving the level of service at several on-airport intersections.
- Enhancing SWSA employee access to mass transit at MBTA Blue Line Airport Station and the Silver Line stop at Terminal A.
- Managing the growth in demand for rental car customers and air passengers parking requirements.
- Fully embracing sustainable design, construction and operations guidelines in order to lessen environmental locally and regionally during the construction phases and during long-term operation.

The project Environmental Notification Form (ENF) was noticed in the November 26, 2007 Environmental Monitor and the Secretary's Certificate including the scope for the Draft Environmental Impact Report (DEIR) was issued on January 30, 2008 after an extended public comment period.

The Executive Office of Energy and Environmental Affairs published the notice of availability of the DEIR/EA (Environmental Assessment) for public review in the July 9, 2008 edition of The Environmental Monitor, commencing the public review period. Massport requested that the 30-day DEIR/EA public review period be extended to approximately 80 days with public comments due by September 26, 2008.

Logan Employee Transportation Management Association

Massport strives to reduce the number of Airport employees commuting by private automobile, to enhance commuter options, and to reduce traffic and parking demands at the Airport. To help accomplish these objectives, Massport established the Logan TMA in 1997. The Logan TMA's goals are to:

- Reduce Airport employee parking needs, traffic congestion, air pollution, and commuting costs by organizing/supporting alternatives to drive-alone commuting.
- Enhance public and private transportation services to Logan Airport through advocacy/support for expanded HOV services and discount fares for Airport employees.
- Provide a forum for Logan Airport tenants and employees to address common transportation concerns, and to work with government entities to create coordinated transportation management programs.

The Executive Office of Transportation and Public Works (EOTPW), through its MassRIDES program provides the Logan TMA coordinator role. EOTPW's administrative support for the Logan TMA allows Massport to use its financial resources to support Transportation Demand Management (TDM) services. Massport contributes $65,000 to the Logan TMA annually and provides space and equipment for the Logan TMA transportation store in Terminal C.

The Logan TMA advises employers on transit benefits and provides information on available commuting transportation alternatives, ride-matching services, and reduced-rate HOV/transit fare options. In addition, the Logan TMA facilitates the purchase of reduced fare MBTA transit passes. The Logan TMA actively encourages airlines, rental car companies, cargo transport companies, and other tenants at Logan Airport to join the Logan TMA as a means to offer commuting incentives to their employees and to help to reduce traffic growth and parking demands at the Airport. To encourage membership, the Logan TMA instituted individual membership for employees whose companies are not corporate members. A $10 monthly fee (or $100 annual fee) entitles the individual member to all Logan TMA services and privileges.

Seven new organizations joined the Logan TMA in 2007, including British Airways, HMS Host, Hudson News, Virgin Airways, UPS, Midwest Airlines, and Air France. Massport, BAA Boston, Delta Air Lines, Jet Blue Airways, Signature Flight, Westfield Concession Management, Travelex, and Brookstone continued their membership from 2006. A total of 2,641 employees, up from 1,909 in 2006, are represented by these organizations at Logan Airport.

Table 5-2 Logan TMA Membership 2007

Year	Number of Employees
2004	5,200
2005	2,874
2006	1,909[1]
2007	2,641
Percent Change (2006-2007)	38.3%

Source: Logan Employee Transportation Management Association (Logan TMA).
1 The *2006 EDR* reported that 1,009 employees were Logan TMA members in 2006. However, members from one organization were not included and the correct total. For 2006 is1,909.

Benefits and services provided to Logan TMA members in 2007 included the following:

- East Boston early morning shuttle service (Sunrise Shuttle) was launched in August 2007. This shuttle service provides low-cost efficient transportation to Airport employees who live in East Boston. The shuttle service operates between 3:00 AM and 6:00 AM, with half hourly shuttles transporting employees between various East Boston locations and the Airport terminals. Ridership levels average 200 employees per month.
- Discounted fares on Logan Express, MBTA transit services, and water shuttle services are available through member employers and the Logan TMA Transportation Store.
- Computerized ride-matching services for carpooling and vanpooling.
- Company Commuter Mobility Programs — The Logan TMA generates individualized commuter mobility programs for member organizations that present the best actions a company can take to reduce its own employees' dependence on the automobile.
- Marketing Events — The Logan TMA participates in Airport-wide, community, and individual employer events, such as Transportation Awareness Day, to disseminate information about Logan TMA services.

- Advocacy — The Logan TMA advocates for improved service and reduced fares for its members from Massport, the MBTA, or other providers of mass transit and other alternative forms of transportation.
- The Logan TMA Preferential Carpool Parking Program began in May 2007, providing free onsite parking to employees of Logan TMA member companies who carpool in groups of three or more.
- The Commuter Cash program was implemented in 2007 to financially reward employees ($3/day) who switch from driving alone to either carpooling, bicycling, walking, or using public transportation.

A number of companies, including companies not currently Logan TMA members, offer a $59 subsidy to employees using public transit or Logan Express to travel to work at the Airport.

Logan Airport 2007 Air Passenger Ground Access Survey

To better understand the ground access travel characteristics of air passengers to and from Logan Airport and to track historical trends of these characteristics, Massport administers a periodic (typically every three years) extensive survey of air passengers. Since the late 1970s, the Logan Airport Air Passenger Ground Access Survey is one of Massport's primary tools for understanding the changes in ground access patterns and the effectiveness of policies and services. It is also used to shape the direction of ongoing and new Logan Airport planning efforts to encourage Logan Airport travelers to use HOVs instead SOVs. The survey is the principal means of measuring air passenger HOV mode share.

In addition to collecting information about mode choice, the survey also facilitates a better understanding of air passengers' origins within the Metropolitan Boston area and New England, shifts in market segments (i.e., business/non-business and resident/non-resident populations), and the perceived effectiveness of customer services provided at Logan Airport. This section presents the results of the Logan Airport 2007 Air Passenger Survey and compares the findings to the results of previous surveys in relation to:

- Survey Administration
- Origin in the Metropolitan Boston Area
- Market Segment
- Ground Access Mode Share by Market Segment
- Aggregate Ground Access Mode Share

Survey Administration

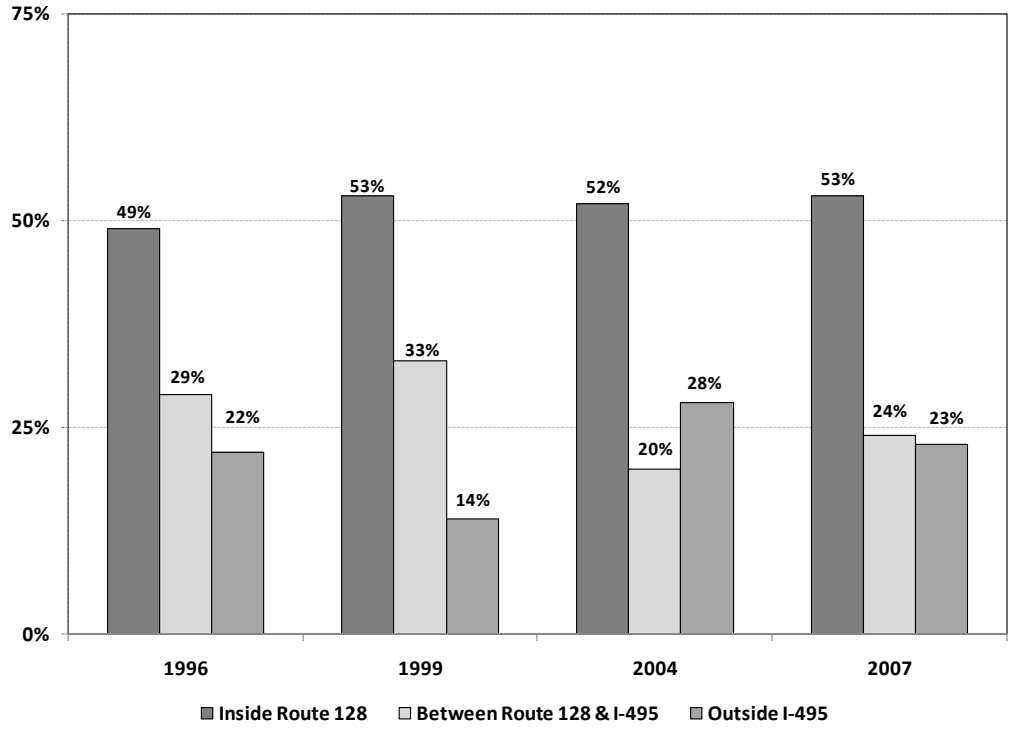
The Logan Airport 2007 Air Passenger Survey was conducted from Monday, April 23 through Sunday, May 5, 2007, a period consistent with previous surveys.[2] A sample of departing passengers was surveyed in the departure lounges through the use of a detailed self-completion questionnaire. A total of 255 flights were surveyed, providing a total of 10,056 usable responses.

2 In addition to surveys conducted in Spring 1996, 1997 and 2004, a survey was conducted in 2003, but in October, due to travel disruptions that year. The results of that survey are not presented here for comparison because the fall survey results would not contribute to a spring trend analysis.

Origins of Air Passengers

Figure 5-7 indicates how the distribution of air passenger trips by geographic area has changed since 1996. The share of trips coming from inside Route 128 and between Route 128 and Interstate 495 has increased slightly as a share of the total trips while trips originating beyond Interstate 495 decreased slightly.

Figure 5-7 Ground Access Market Share Air Passenger Market Segments



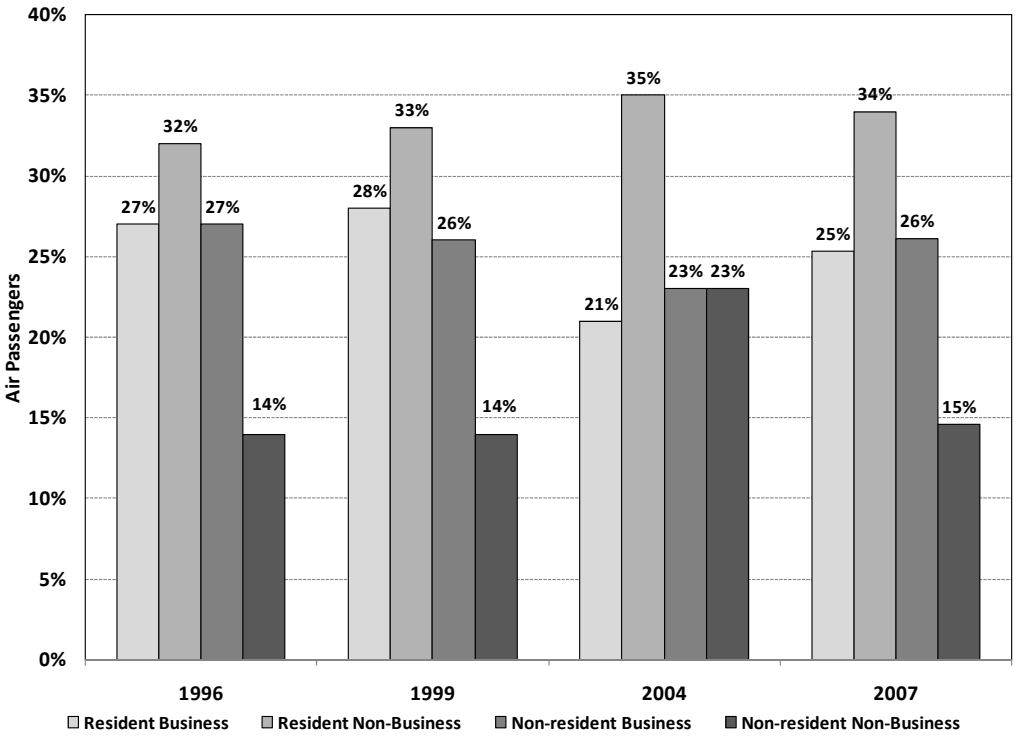
Since 1979, Massport has analyzed air passenger travel behavior by four distinct market segments:

- Resident Business: passengers living within the region served by Logan Airport and traveling for business reasons.
- Resident Non-Business: passengers living within the region served by Logan Airport and conducting personal travel.
- Non-Resident Business: passengers living outside the region and traveling to conduct business.
- Non-Resident Non-Business: passengers living outside the region and traveling for personal reasons, i.e. leisure travelers.

Residents are defined as passengers who live in New England and use Logan Airport as their "home" airport, regardless of their proximity to other airports. It is important to study the passenger market in this manner because sensitivity to key factors that influence travel behavior such as convenience, time reliability, and pricing varies substantially among these user groups.

Figure 5-8 compares the share of weekday trips by market segment across four recent surveys. The resident non-business market is the largest market segment, contributing about one-third of all passengers at Logan Airport. This market decreased by 1 percent between 2004 and 2007 while the percentage of resident business trips increased by 4 percent. Most notably, the market share of non-resident non-business trips dropped to 15 percent in 2007.

Figure 5-8 Weekday Market Segments[1]



Source: 1996, 1999, 2004 and 2007 Logan Airport Passenger Surveys.
1 Based on weekday air passengers.

Table 5-3 combines the market segment and origin area information shown above. Trips by residents are shown to be higher than non-residents; particularly between Route 128 and Interstate 495. Within Interstate 495, about one-half of all trips are business related. Outside of Interstate 495, over 60 percent of trips are leisure in nature.

Table 5-3 Market Segment by Trip Origin Area

Market Segment	Inside Route 128	Between Route 128 and Interstate 495	Outside Interstate 495
Resident Business	22%	32%	22%
Resident Non-business	29%	38%	41%
Non-resident Business	29%	18%	16%
Non-resident Non-business	20%	12%	22%

Source: Logan Airport 2007 Air Passenger Survey.

Ground Access Modes of Travel

As discussed previously, air passengers traveling to and from Logan Airport have several ground access modes available to them, as follows:

- Private Automobile: This includes all passengers picked-up or dropped-off by automobile, and all passengers who drive and park at the Airport.
- Taxi: A passenger driven to or from Logan Airport by a licensed, commercial taxi.
- Rental Car: A passenger who rents a car from an on-Airport or nearby off-Airport rental car agency.
- Scheduled HOV Service: A passenger who arrives at or departs from Logan Airport via scheduled bus or limousine service, including privately operated services, Massport's Logan Express, or Logan Direct service.
- Unscheduled HOV Service: Travel via limousine/van on unscheduled carriers.
- Transit: A passenger who takes an MBTA service or one of the water transportation services (operated in conjunction with a dedicated Massport shuttle bus to/from Logan Airport terminals).
- Hotel Courtesy Shuttle: A passenger who arrives at or departs from the Airport in a hotel courtesy shuttle.
- Other: this includes walk, bike, and charter bus trips.

Table 5-4 presents mode shares by market segment. HOV mode share for the non-resident business segment has decreased from 28 percent in 2004 to 24 percent in 2007. Most of this market continues to choose taxis and rental cars as their primary ground access mode to and from Logan Airport.

From 2004 to 2007, HOV mode share decreased in both non-resident market segments. The resident-business market held steady at 26 percent for HOV modes, while the resident non-business increased by 1 percent for HOV modes. This is an indication that resident non-business (leisure) travelers are increasing use of HOV transportation to/from the Airport despite the Interstate 90 roadway connection easing SOV travel from a number of communities. The non-resident market saw an increase in taxi use and a shift from the use of private automobiles to rental cars over the past three years.

Table 5-4 Ground Access Mode Share by Market Segment (all passengers)

	Resident Business				Non-Resident Business			
Ground Access Mode	1996	1999	2004	2007	1996	1999	2004	2007
Non-HOV								
Private Automobile	49%	50%	54%	54%	9%	9%	18%	12%
Taxi	20%	23%	19%	18%	31%	31%	30%	35%
Rental Car	1%	1%	1%	2%	34%	34%	24%	29%
Subtotal Non-HOV	70%	74%	74%	74%	74%	74%	72%	76%
HOV								
Un-scheduled HOV	12%	12%	11%	13%	6%	6%	7%	8%
Scheduled HOV	12%	9%	8%	6%	7%	8%	7%	3%
Transit	5%	5%	5%	6%	8%	8%	6%	6%
Hotel courtesy shuttle	<1%	<1%	1%	<1%	4%	4%	7%	5%
Other	<1%	<1%	1%	1%	<1%	<1%	1%	2%
Subtotal HOV	30%	26%	26%	26%	26%	26%	28%	24%
	Resident Non-Business				Non-Resident Non-Business			
Ground Access Mode	1996	1999	2004	2007	1996	1999	2004	2007
Non-HOV								
Private Automobile	48%	46%	49%	51%	31%	35%	38%	36%
Taxi	13%	15%	16%	14%	17%	16%	15%	19%
Rental Car	1%	1%	3%	2%	24%	20%	17%	19%
Subtotal Non-HOV	62%	62%	68%	67%	72%	71%	70%	73%
HOV								
Un-scheduled HOV	14%	10%	9%	7%	3%	4%	5%	3%
Scheduled HOV	14%	11%	13%	12%	14%	10%	11%	6%
Transit	6%	14%	8%	11%	6%	12%	8%	9%
Hotel courtesy shuttle	2%	2%	1%	3%	4%	3%	5%	5%
Other	1%	<1%	1%	1%	<1%	<1%	1%	4%
Subtotal HOV	37%	38%	32%	33%	28%	29%	30%	27%

Source: 1996, 1999, 2004 and 2007 Air Passenger Ground Access Surveys.

Table 5-5 presents aggregate passenger mode shares from 1996 through 2007. As the data indicate, the overall HOV mode share for air passengers decreased from 30.7 percent in 1999 to 30.3 percent in 2004, and in 2007, decreased to 27.8 percent. The overall decrease in HOV mode share to/from the Airport is largely reflective of the changes in transportation choices of the non-resident market, who rely more on rental cars and private automobiles for their airport access needs.

Table 5-5 Ground Access Aggregate Mode Share

Ground Access Mode	1996	1999	2004	2007
Non-HOV				
Private Automobile	35.1%	36.5%	36.0%	40.2%
Taxi	20.5%	20.6%	22.8%	19.7%
Rental car	13.3%	12.2%	10.9%	12.4%
Total non-HOV Share	68.9%	69.3%	69.7%	72.3%
HOV				
Unscheduled HOV	10.0%	8.9%	8.1%	7.3%
Scheduled HOV	11.9%	9.5%	10.6%	6.9%
Transit	6.4%	9.7%	6.5%	6.7%
Courtesy Shuttle	2.2%	2.1%	3.1%	3.5%
Other	0.6%	0.5%	2.0%	3.4%
Total HOV Share	31.1%	30.7%	30.3%	27.8%

Source: 1996, 1999, 2004 and 2007 Air Passenger Ground Access Surveys.

Airport Employee Commute Trips

In 2007, Massport conducted an Employee Commute Survey at Logan Airport. The purpose of this survey, which was previously conducted in 1990, 1995 and 2001, was to assist Massport in understanding employee geographic origins, commuting patterns, mode shares, and other commute travel information. This section describes the survey process and reports on employee demographics and HOV mode shares.

Logan Airport 2007 Employee Survey Process

The Logan Airport 2007 Employee Survey sought several important data sets including commuting concerns, interest in TDM measures, and commuting origins. Massport distributed the employee commute survey questionnaires using three different distribution methods. The primary distribution method was handled with the help of employers. Massport and Logan TMA staff contacted each company or agency with Logan Airport-based employees in order to find out how many survey forms needed to be dropped off at the appropriate work site and to identify a contact person. Staff handed survey forms to the contact person, who then distributed the surveys to their employees. Some opted to use their employee mailboxes; others distributed the surveys with paychecks. Employers were also given collection/return envelopes.

In order to ensure responses (particularly open-ended feedback) were received from Logan Express users who park at Chelsea Garage (riders of the Massport Shuttle 77), staff also distributed surveys directly to them. In both cases, the survey distribution was conducted on a single day at each location. At the Braintree, Framingham, and Woburn Logan Express sites staff offered a survey to all boarding Airport employees on the early morning and midday departures to Logan Airport. Although employee commute surveys were not distributed at the Peabody Logan Express site, the survey captured Peabody Logan Express riders via the other distribution methods. Drivers had collection envelopes to collect the surveys, and returned them to Massport staff or bus operator management. At Chelsea Garage, the bus operations supervisor handed out surveys to bus passengers boarding Shuttle 77 during a 12-hour period; boxes were placed in the buses for collection of survey forms.

The objective of the survey distribution was to reach out to all employees who regularly report to Logan Airport for work (sampling the full population of employees was the approach used in the 1990, 1996, and 2001 surveys). However, the three different distribution methods used resulted in the survey of only a partial sample of Logan Airport-based employees, as shown in Table 5-6.

Table 5-6 Employee Survey Response Rate

Year	Number of surveys distributed	Usable Responses	Response Rate
1990	15,751	2,373	28.7%
1995	14,551	4,704	32.3%
2001	20,279	4,818	23.8%
2007	9,549[1]	1,684	18%

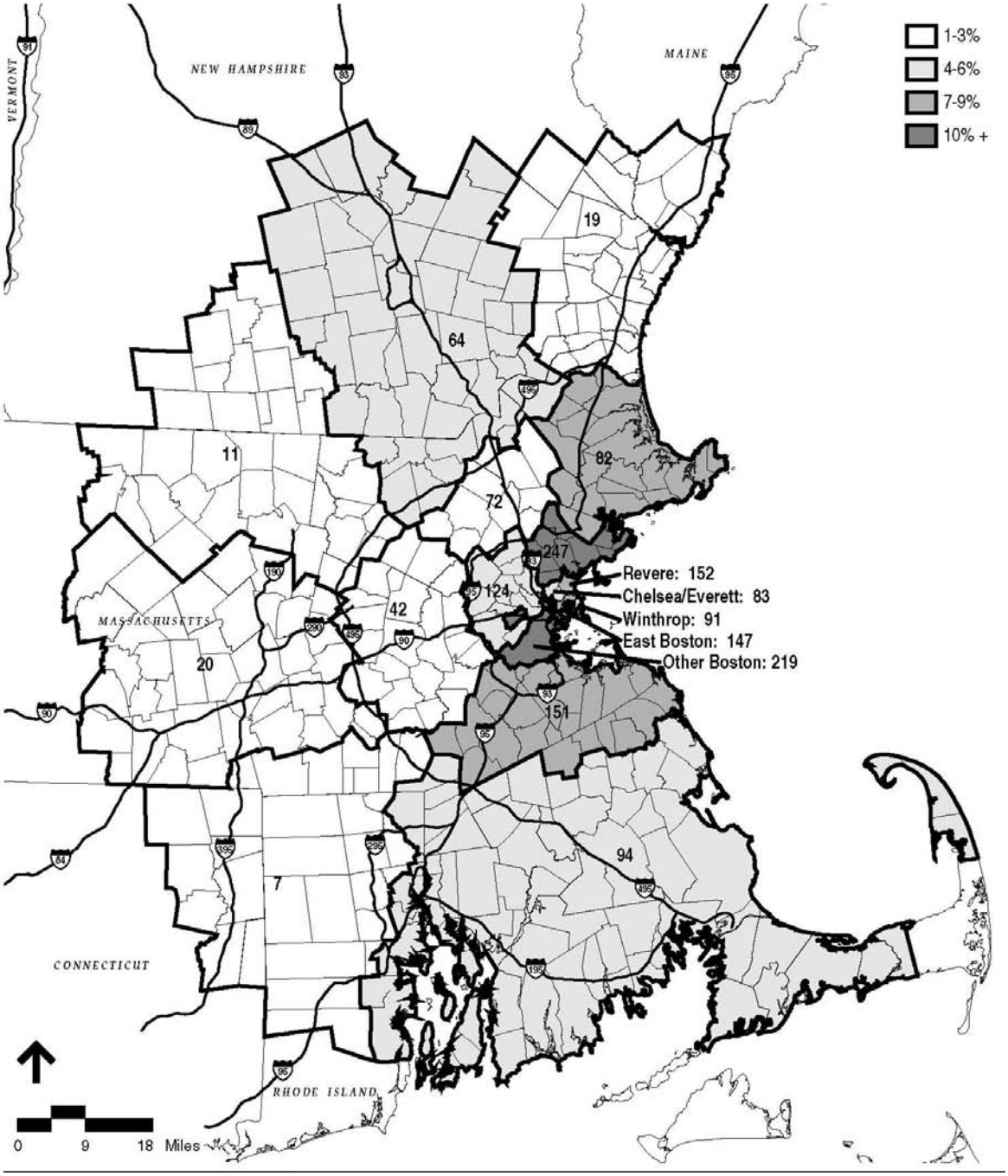
Source: 1996, 1999, 2004 and 2007 Employee Surveys.
1 Subset of employees.

Employee Demographics

Figure 5-9 depicts the employee origin in relation to the distance from Logan Airport. Of Logan Airport's employees, 65 percent reside within Route 128, with 41 percent living just north and west of the Airport in the communities of Boston, East Boston, Chelsea, Everett, Winthrop, and Revere.

Because Logan Airport operates 365 days a year, 24 hours a day, employees arrive and depart from the Airport on a continuous basis. As a result, only 40 percent of all employees arrive during the weekday morning peak (5:00 AM to 9:00 AM) with about 25 percent arriving by 5:00 AM. Early arrivals generate early departures and 25 percent of early arrivals leave Logan Airport between noon and 3:00 PM. Approximately 36 percent of employees work at the Airport on weekends.

Figure 5-9 Logan Airport Employee Places of Origin



Source: Logan Airport 2007 Employee Survey.
Note: Numbers indicate number of employees (survey respondents).

Employee Transportation Mode Share

Table 5-7 identifies Logan Airport average employee mode shares since 1990 as collected via Airport Employee Travel Surveys that were administered in four of these years. Mode shares constitute the average percent of the employee population that commutes to the Airport by a particular mode of travel (i.e., car, MBTA, Logan Express, etc.) on a typical weekday. Actual increases or decreases in total ridership on a particular mode are not necessarily indicative of changes in mode share. Employee growth in particular, could also affect measured ridership levels without necessarily resulting in mode share shifts.

Table 5-7 Employee Mode Share

Access Mode	1990	1995	2001	2007
Drive Alone[1]	83.8%	73.5%	73.3%	68.5%
HOV/Alternative Modes				
Rideshare	2.5%[2]	4.9%[2]	4.5%	3.9%
MBTA Services	10.7%	12.0%	13.8%	14.3%
Logan Express	0.3%	4.5%	4.8%	11.0%
Other[3]	2.7%	5.1%	3.7%	2.3%
Total HOV Share	16.2%	26.5%	26.8%	31.5%

Source: 2007 Airport Employee Travel Survey based on average weekday commuters.
1 Drive alone includes pick-up/drop-off which was 3.9 percent in 2007.
2 Estimated. Survey did not differentiate between carpoolers and drop-off/pick-up prior to 2001.
3 Bicycle, taxi, company vehicle, limousine, hotel shuttle, private bus, water transportation, and walk.

From 1990 to 2007, the Airport has seen a doubling in the number of employees who commute to work via HOV or alternative means of transportation. During this time, the drive alone mode share has decreased from 83.8 percent in 1990 to 68.5 percent today. Between 2001 and 2007, there was a 4.8 percent decrease in the drive alone mode share. Transit services, particularly Logan Express, have seen substantial increases in employee use.

Ground Access Traffic Conditions

This section presents ground access traffic conditions at Logan Airport in 2007, including gateway traffic volumes and VMT estimates for Logan Airport's roadway system. Gateways are defined as points through which Logan Airport is accessed, and include the Route 1A roadway ramps, Ted Williams Tunnel (Interstate 90) ramps, Neptune Road, and Maverick Street.

Gateway Traffic Volumes

Table 5-8 summarizes Logan Airport daily gateway traffic volumes for the years 2004 through 2007. The table includes average annual daily traffic (AADT), average annual weekday daily traffic (AWDT), average weekend daily traffic (AWEDT), and annual air passengers. Gateway traffic volumes were not collected in 2006 due to the closure of the Ted Williams Tunnel. As such, 2005 is considered the benchmark for the now completed roadway system at Logan Airport.

Table 5-8 Logan Airport – Gateway Airport-Related Annual Daily Traffic

	AADT		AWDT		AWEDT		Annual Air Passengers	
Year	Volume	Percent Change	Volume	Percent Change	Volume	Percent Change	Level of Activity	Percent Change
2004	100,206	12.6%	106,278	13.4%	84,950	10.0%	26,142,516	14.7%
2005	106,000	5.8%	112,600	6.0%	89,400	5.2%	27,087,905	3.6%
2006	NA	NA	NA	NA	NA	NA	27,725,443	2.4%
2007	110,690	4.4%	119,200	5.9%	91,320	2.1%	28,102,455	1.4%

AADT Average annual daily traffic.
AWDT Average annual weekday daily traffic.
AWEDT Average weekend daily traffic.
NA Not available.

The AADT increased by 4.4 percent from 2005 to 2007. This increase in traffic volume can be attributed to the combination of an overall 1.4 percent increase in air passenger activity in 2007, an 8.8 percent increase since 2005 in taxi service, and a slight decrease in Logan Express passenger ridership (as discussed previously in this chapter, Logan Express employee ridership increased in 2007).

As noted in the *2004 ESPR*, the Logan Airport trip distribution model was updated to reflect the completion of the majority of Airport roadway modifications associated with the CA/T and Logan Airport Modernization projects. Prior to 2007, all significant roadway modifications for those projects were complete, including Terminal A and the opening of the authorized vehicle-access Service Road that connects the new MBTA Airport Station to Porter Street. The Central Garage addition was completed in the spring of 2007 and marks the end of the Logan Airport Modernization project.

The model's ground transportation infrastructure was reviewed to ensure that the model is an appropriate representation of the as-built condition. Adjustments were then made to account for any differences between the design plans and the as-built condition, including a specific adjustment to account for the change in roadway network design near Terminal E. A ramp connecting service road SR-2 to the main Airport circulation roadway was part of the design used in the original traffic model base; since this service road was not constructed as part of the overall project, the model was then adjusted to eliminate it from the roadway network.

Vehicle Miles Traveled

Vehicle miles traveled (VMT) at Logan Airport are calculated for each year using a model that was developed based on Logan Airport's 1994 roadway system. Since then, the roadway network in the model has been adjusted on an annual basis to account for various changes in Airport roadways over time. Modeled gateway traffic volumes have also been annually adjusted to reflect changes in traffic volumes based on counts at the Airport gateways and changes in the roadway system. As discussed in the previous section, roadways designed as part of the Logan Airport Modernization Project that were not ultimately constructed have now been eliminated from the VMT model thereby improving the model's accuracy.

In 2004, the distribution portion of the VMT model was modified to reflect the substantial changes in the roadway system that resulted from both the Logan Airport Modernization program and the CA/T project. As part of the update, an extensive traffic count program was conducted in 2004 to provide current demand and distributional characteristics of traffic on the Airport roadway system. Counts were taken at gateways and internal roadways and used to calibrate the distribution portion of the model to reflect current traffic conditions on the Airport roadway system. When compared to 2004, demand and distributional characteristics of the traffic on the Airport roadway system have not changed significantly, with the exception of the aforementioned changes. Over the coming years, Massport will conduct spot counts to confirm that the model reflects Airport roadway traffic volumes as travelers adjust to the completion of the roadway system improvements.

Consistent with previous years, the following specific time periods were analyzed for 2007:

- Morning peak hour (AM Peak Hour)
- Evening peak hour (PM Peak Hour)
- Highest consecutive 8-hours (High 8-Hour)
- AWDT

The AWDT analysis provides an indication of the overall effects of changes in traffic flow during an average weekday. The highest consecutive 8-hour (High 8-hour) VMT was calculated by applying a ratio of 0.48 to daily traffic for each of the roadway link. This ratio, or K-factor (the percentage of daily traffic occurring during the highest eight consecutive hours), is the same factor used in previous Logan Airport environmental filings. The morning and evening peak hour traffic volumes are based on the ratios of peak hour volumes to daily volumes obtained from previous 2010 model projections.

Table 5-9 summarizes the VMT estimates for Logan Airport-related traffic from 2004 through 2007. Average annual weekday daily traffic VMT for Airport-related traffic increased by 10.4 percent in 2007 (compared with 2005). This increase in VMT was greater than the 5.9 percent increase in Airport-related AWDT volumes. This is due largely to the change in the distribution of traffic volumes at the gateways. The traffic volume data show that the majority of the volume increase was experienced at the Route 1A gateways. Since the distance between Route 1A and the terminal roads is longer than the distance to/from the Ted Williams Tunnel, VMT grew at a disproportionally higher rate than previous years. Furthermore, in 2007, Massport completed Phase II of the West Garage project that added two levels to the Central Garage. Details of the 2007 VMT estimates are presented in *Appendix G, Ground Transportation*.

Table 5-9 Airport Study Area Vehicle Miles Traveled (VMT) for Airport-Related Traffic

Analysis Year	Morning Peak Hour	Evening Peak Hour	High 8-Hour	Average Weekday	Average Weekday Percent Change
2004	8,292	10,563	77,029	160,477	3.5%
2005	8,477	10,998	80,240	167,166	4.2%
2006	NA	NA	NA	NA	NA
2007	9,594	12,304	88,614	184,613	10.4%

NA Not available.

2007 Parking Conditions

Massport manages its parking supply at Logan Airport to promote long-term rather than short-term parking, to support efficient parking utilization, and to comply with the provisions of the Logan Airport Parking Freeze. Security restrictions on curbside parking, however, have made it necessary for Massport to alter its parking rates for short-term parking to accommodate pick-up and drop-off activity. Massport has added hourly parking spaces specifically designed for this purpose.

The number of commercial parking spaces allowed at Logan Airport is regulated by the Logan Airport Parking Freeze (310 Code of Massachusetts Regulations 7.30), which is an element of the Massachusetts State Implementation Plan (SIP) under the Federal Clean Air Act (CAA). Table 5-10 presents the total number of parking spaces permitted on-Airport and Massport's allocation of these spaces between commercial and employee spaces. Since 2001, Massport has had an upper limit of 20,692 total spaces. Further detail on Logan Airport's parking supply is presented in *Appendix G, Ground Transportation*.

Table 5-10 Logan Airport Parking Freeze Summary

	Type of Spaces		
Year	On-Airport Commercial Spaces	On-Airport Employee Spaces	Total Logan Airport Parking Spaces Permitted
1992 - 1994	12,215	7,100	19,315
1995 - 1997	12,890	6,425	19,315
1998 - 2000	14,090	5,225	19,315
2001[1] - 2006	15,467	5,225	20,692
2007	17,319	3,373	20,692

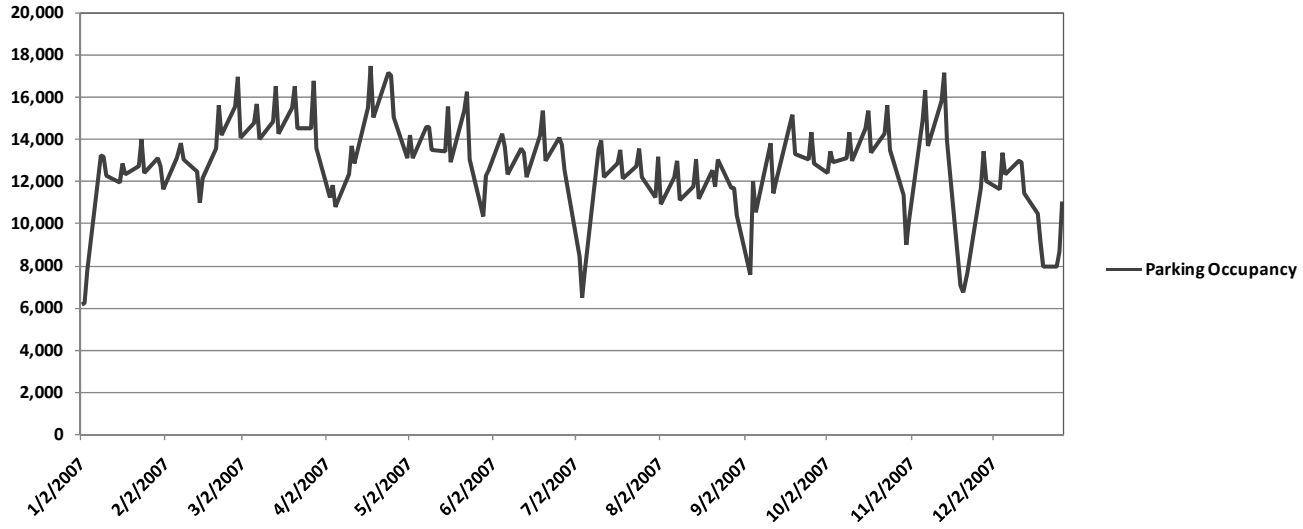
Source: Massport.

1 In 2000, the Massachusetts Department of Environmental Protection (MADEP) approved an amendment to the Logan Airport Parking Freeze to accommodate the transfer of 1,377 spaces originally located in the East Boston Parking Freeze Area to the Logan Airport Parking Freeze Area.

Parking Demand

On-Airport commercial parking occupancy typically peaks mid-week (Tuesday through Thursday) with lower occupancies occurring on other days. The number of vehicles parked at Logan Airport in commercial spaces over the course of any 24-hour period was derived from count data for Tuesdays, Wednesdays and Thursdays throughout 2007, and the results are presented in Figure 5-10. At no time were the Logan Airport Parking Freeze limits exceeded.

Figure 5-10 2007 Daily Peak Commercial Parking Occupancy



Source: Massport, Parking Operations Unit.
Note: Maximum commercial parking spaces permitted by Logan Airport Parking Freeze: 17319. At no time were the Parking Freeze supply limits exceeded.

Parking Duration

Total parking activity decreased by 16.9 percent between 2005 and 2007. A portion of this decrease is likely attributed to the increase of pick-up and drop-off. Table 5-11 presents combined annual activity for Logan Airport parking facilities. In 2007, 55 percent of all parking activity at Logan Airport was between zero and four hours, down 366,814 tickets (20.9 percent) from 2005. This decrease continues a downward trend since 2004 and reflects Massport initiatives to reduce short-term parking and overall VMT at the Airport.

Table 5-11 Parking Exits by Length of Stay

		0-4 hrs.	4-24 hrs.	1-4 days	> 4 days	Total
2004	Tickets	1,773,175	252,480	722,812	221,108	2,969,575
	Percent	59%	9%	24%	8%	100%
2005	Tickets	1,751,761	290,623	723,547	247,874	3,013,805
	Percent	58%	10%	24%	8%	100%
2006	Tickets	1,634,898	262,152	660,184	202,366	2,759,600
	Percent	59%	10%	24%	7%	100%
2007	Tickets	1,384,947	237,171	659,763	223,132	2,505,013
	Percent	55%	9%	26%	9%	100%
Percent Change (2005-2007)		-20.9%	-18.4%	-8.8%	-10.0%	-16.9%

Source: Massport.

2007 Parking Costs

Massport sets and controls parking rates for four Airport parking areas (Table 5-12). Since Massport has no control over off-Airport parking rates, these rates are not provided. Many off-Airport areas, such as PreFlight parking in Chelsea, are independently owned and operated and are outside of the Logan Airport Parking Freeze. Parking fees can be pre-paid at kiosks inside the terminals and pedestrian walkways. Pay stations are located at the entrances to the Central Garage, Terminal B, and Terminal E parking lot. The percentage of parking patrons using pay-on-foot is about 80 percent.

2007 Parking Services

The Parking PASSport and Parking PASSport GOLD programs were implemented in 2006. Massport offers guaranteed parking through the Parking PASSport Gold program. Parking PASSport Gold provides a guaranteed parking space in dedicated areas of the Terminal B and Central garages and eliminates the need to circle the garage looking for available spaces. As of December 2007, Parking Passport GOLD had slightly over 3,000 customers compared to 1,363 members at the end of 2006. The Parking PASSport program is geared toward travelers, companies, or other organizations that are not likely to make use of HOV transit opportunities. In such cases, providing dedicated immediate parking reduces the need for vehicles to circulate the garage or Airport looking for parking spaces, thereby reducing VMT. Parking PASSport also allows users to enter and exit the garage without pulling a ticket. This service, however, does not guarantee a parking space.

In the State's first preferred parking program for hybrid and AFVs, Massport began offering preferred parking for customers driving hybrid and AFVs in the spring of 2007. Massport created designated preferred parking at the Airport's Central Garage, Terminal B garage, Terminal E surface lot, and economy parking.

Table 5-12 2007 On-Airport Parking Rates

Location	Cost ($)	Location	Cost ($)
Central Parking		Terminal E Lots 1 and 2	
0 to 30 minutes	$3.00	0 to 30 minutes	$3.00
31 minutes to 1 hour	$6.00	31 minutes to 1 hour	$6.00
1 to 1.5 hours	$9.00	1 to 1.5 hours	$9.00
1.5 to 2 hours	$12.00	1.5 to 2 hours	$12.00
2 to 3 hours	$15.00	2 to 3 hours	$15.00
3 to 4 hours	$18.00	3 to 4 hours	$18.00
4 to 7 hours	$22.00	4 to 7 hours	$22.00
7 to 24 hours	$24.00	7 to 24 hours	$24.00
Additional days 0 to 6 hours	$12.00	Additional days 0 to 6 hours	$12.00
Additional days 6 to 24 hours	$24.00	Additional days 6 to 24 hours	$24.00
Terminal B Garage		Economy Parking	
0 to 30 minutes	$3.00	Daily Rate	$18.00
31 minutes to 1 hour	$6.00	Additional days 0 to 6 hours	$ 9.00
1 to 1.5 hours	$9.00	Additional days 6 to 24 hours	$ 18.00
1.5 to 2 hours	$12.00	Weekly Rate (6-7 days)	$ 108.00
2 to 3 hours	$15.00		
3 to 4 hours	$18.00		
4 to 7 hours	$22.00		
7 to 24 hours	$24.00		
Additional days 0 to 6 hours	$12.00		
Additional days 6 to 24 hours	$24.00		

Source: Massport.



Preferred Parking Program for Hybrid and Alternatively-Fueled Vehicles

Cell Phone Waiting Lot

In September 2007, 50 parking spaces were assigned to the Cell Phone Waiting Lot, a parking area located off Harborside Drive. Previously, drivers who were waiting for arrivals either used the short-term parking, circulated around the Airport, or idled at the curb until moved by state troopers. The construction of this parking lot provides a hassle-free waiting spot for drivers awaiting arriving flights. The maximum wait time at this parking lot is 30 minutes and parking is free.



Cell Phone Waiting Lot

Ground Access Planning

Massport has established a number of goals related to the ground access system, parking facilities, and other transportation infrastructure that serve air passengers, Airport employees, and other Airport users. Table 5-13 lists each ground access goal and updates Massport's initiatives associated with each goal. The details of each initiative, where appropriate, have been described in other parts of this chapter.

Massport continues to plan, design and implement ground access initiatives to address these goals. Massport continuously refines these initiatives to account for the changing national, regional and local environments that affect Logan Airport and its users. Several elements of Massport's Sustainability Initiatives are reflected in the ground access planning activities, which are primarily aimed at reducing reliance on single occupant vehicles for passengers, employees and other Airport users. These measures include:

- Promote and support of HOV modes (Logan Express, MBTA, water transportation, etc.)
- Establish, support and actively participate in the Logan TMA
- Improve terminal access (curbs) for HOV modes

Table 5-13 Ground Access Planning Goals and Progress

Goal	2007 Update
Increase air passenger HOV mode share to 35.2 percent by the time Logan Airport accommodates 37.5 million annual air passengers	The Logan Airport 2007 Air Passenger Survey demonstrated a 27.8 percent HOV mode share (down from 30.3 percent in 2004) for 28.1 million air passengers. Massport continues to provide and actively promote numerous HOV options that are available to air passengers, including operation of Logan Express. Massport initiated work on a long-range Ground-Access Policy Plan, which will investigate ways to increase HOV mode share.
Reduce employee reliance on commuting alone by private automobile	Massport continues to support the Logan TMA with $65,000 annually as well as space and equipment for the Logan TMA Store in Terminal C. Through a partnership with the EOTPW, the Commonwealth now provides Massport with a Logan TMA coordinator. This allows Massport to use funds from Logan TMA members exclusively for transportation services. The Logan Airport 2007 Employee Survey showed an employee HOV mode share of 29.8 percent.
Increase the overall efficiency of the metropolitan transportation system through interagency coordination	Massport participates in the Metropolitan Planning Organization (MPO) process to promote planning and funding of transportation system options that enhance access to the Airport. Massport and the MBTA have worked together on several initiatives including the renovated Airport Blue Line station, the Silver Line extension to Logan Airport, and the Urban Ring planning (underway).
Improve management of on-Airport ground access and infrastructure through technology	Massport disseminates ground access and parking information through the Internet (www.massport.com), a toll-free telephone number (1-800-23-LOGAN), Smartraveler and in-Airport kiosks.
Provide adequate, long-term parking within the limits of the Logan Airport Parking Freeze	The total number of spaces at the Airport remains below the Logan Airport Parking Freeze cap. As part of the SWSA Redevelopment project, Massport is planning additional commercial spaces to adequately accommodate long-term needs while remaining within freeze limits.

6
Noise Abatement

Introduction

Massport strives to minimize the noise effects of Airport operations on its neighbors through the use of a variety of noise abatement programs, procedures, and other tools. Logan Airport has one of the most extensive noise abatement programs of any airport in the nation including: residential and school sound insulation programs; flight tracks designed to optimize over-water operations (especially during nighttime hours); and preferential runway use goals. The foundation of Massport's comprehensive noise abatement program is the *Logan Airport Noise Abatement Rules and Regulations*[1] (the Noise Rules) which have been in effect since 1986. Massport has a Noise Abatement Office (NAO) that is responsible for implementing noise abatement measures and generally monitoring community complaints and other aspects of the noise impact from Logan Airport operations.

This chapter describes noise conditions at Logan Airport related to Airport operations during 2007, and compares the findings to those for 2006. Noise conditions for 2007 were assessed primarily through computer modeling, supplemented by the analysis of measured noise levels from Logan Airport's new noise monitoring system. Information presented includes summaries of the operational data used in the noise modeling, as well as the resultant annual Day-Night Sound Level (DNL) noise contours, a comparison of the modeled results with measured levels from the monitoring system, and estimates of the population residing within various increments of noise exposure. Analyses also include a number of supplemental metrics including Logan Airport's Cumulative Noise Index (CNI) and reporting on the times above (TA) various threshold sound levels. Massport's progress on implementing noise abatement measures is also presented.

Key Findings

In 2007:

- While annual aircraft operations slightly decreased from 406,119 in 2006 to 399,537 in 2007 (a decrease of 1.6 percent), passenger levels continued to increase from 27.7 million to 28.1 million (1.4 percent), reflecting increased load factors (a greater number of passengers per aircraft operation).

1 *Logan Airport Noise Abatement Rules and Regulations* are codified at 740CMR 24.01 et seq.

- The number of aircraft operations in 2007 remained below historic peaks. Daily operations in 2007 averaged approximately 1,095 compared to approximately 1,113 in 2006, a decrease of about 18 operations per day.
- This *2007 Environmental Data Report (2007 EDR)* reports on the first full year of use of Runway 14-32, which opened in late November 2006. Consistent with the 2002 Record of Decision (ROD) on the Airside Improvements Planning Project Environmental Impact Statement (EIS)[2] and based on Federal Aviation Administration (FAA) data, the runway was used primarily for arrivals over Boston Harbor during 2007. Consistent with historical patterns, despite the introduction of Runway 14-32, the FAA continued to rely on Logan Airport's north-south traffic flow in 2007. However, within the north-west flow, the FAA increased reliance on Runway 33L for departures with an associated reduction in Runway 27 departures.
- The changes in runway utilization in 2007 have led to changes in the noise environment. Since 2006, the noise contours over East Boston and Chelsea have increased and, over the same period, have decreased over South Boston, Revere, and Winthrop.
- The population within the 75-80 decibel (dB) and 70-75 dB DNL contours decreased in 2007 compared to 2006 (see Table 6-6). In 2006, the population in the 75-80 dB DNL contour was 104 but in 2007 zero population was located in this contour. In 2006, the population in the 70-75 dB DNL contour was 597 compared to 416 in 2007. The overall number of people exposed to DNL values greater than 65 dB increased 36 percent in 2007 compared to 2006. An estimated 7,591 people were exposed to DNL levels greater than 65 dB as depicted in the 2007 contour, compared to 5,583 in 2006. This is still well below the pre-September 11, 2001 level of 17,745. The residences exposed to DNL levels greater than 65 dB in 2007 are located within the 65 dB sound insulation contour, and thus are within areas that have been sound insulated by Massport.
- In 2007, Massport provided sound insulation to 548 homes, the majority of which were in Chelsea. The Chelsea program began in 2005 as a pilot program and 854 units have been treated through 2007. The focus of this pilot program is to fulfill federal and state mitigation commitments related to the opening of Runway 14-32. Since the inception of Massport's Sound Insulation program, 10,461 homes have received sound insulation in East Boston, South Boston, Winthrop, and Chelsea.
- The 2007 CNI of 152.7 Effective Perceived Noise Level (EPNdB) remained well below the cap of 156.5 EPNdB established under Massport's noise regulations. The CNI increased slightly compared to 2006 primarily because of a small increase in operations at night.
- The noise modeling process continued to incorporate the automated altitude profile and noise contour generation software first used by Massport for the *2004 Environmental Status and Planning Report* (*2004 ESPR*). This software automates the production of noise contours directly from individual radar traces (the radar systems collected 391,607 radar traces and of these, 351,049 radar traces (90 percent) retained enough information for modeling). The system has remained consistent with approximately 91 percent of tracks available for modeling since 2005.
- Massport continued the installation of an improved noise and operations monitoring system. The flight tracking system and most noise monitors were operational in 2007. The Airport's monitoring system is now enhanced to correlate noise events with individual flight tracks. This has greatly reduced differences between measured and modeled DNL values.

2 *Record of Decision, Airside Improvements Planning Project*, Logan International Airport, FAA, August 2, 2002.

- In accordance with the mitigation commitments from the Logan Airside Improvements Planning Project,[3] this *2007 EDR* reports on dwell and persistence in the neighborhoods that surround Logan Airport.

Regulatory Framework

FAR Part 36

Logan Airport works within a framework of federal aviation regulations that limits an airport operator's ability to control noise. For example, the FAA Federal Aviation Regulation (FAR) Part 36 sets noise limits for aircraft certification and the procedures by which aircraft noise emission levels must be measured to determine compliance. The regulation defines noise emission limits for turbojets, turboprops, and helicopters, classifying turbojets in particular into categories referred to as stages based on noise levels at each of three locations: takeoff, landing, and to the side of the runway during takeoff (sideline). The stages are:

- Stage 1 aircraft are the oldest and usually loudest operations, having preceded the existence of any noise emission regulation. Rare examples include old, restored civil, or military aircraft. No Stage 1 aircraft operate at Logan Airport.
- Stage 2 aircraft are slightly less old and loud; they were the first aircraft types required to meet a noise limit. A subsequent regulation, FAR Part 91 (see below), prohibits a person from operating a Stage 2 aircraft in the continental United States (U.S.) unless its takeoff weight is 75,000 pounds or less.
- Stage 3 aircraft are the newest and quietest of the commercial jets, though some are Stage 2 aircraft fitted with hushkits to allow them to meet the Stage 3 noise limits.
- Stage 4 aircraft are under design or are in early construction. When in production they will be required to be at least 10 dB quieter than Stage 3 aircraft. Jet aircraft certified after January 1, 2006, must meet the Stage 4 limits. Though not required, many of the aircraft in the 2007 Logan Airport fleet would also meet the new Stage 4 noise limits, if they were recertificated.

FAR Part 150

First implemented in February 1981, FAR Part 150 defines procedures that an airport operator must follow if it chooses to conduct and implement an airport noise and land use compatibility plan. Part 150 Noise Compatibility studies require the use of DNL to evaluate the Airport noise environment, and it identifies noise compatibility guidelines for different land uses depending on their sensitivity. Key values include a DNL of 75 dB, above which no residences, schools, hospitals, or churches are considered compatible and a DNL of 65 dB, above which those land uses are considered compatible only if they are sound insulated.

Noise abatement or mitigation measures that an airport operator must consider in a Part 150 study include acquisition of incompatible land, construction of noise barriers, sound insulation of buildings, implementation of a preferential runway program, use of noise abatement flight tracks, implementation of airport use restrictions, and any other actions that would have a beneficial effect on the public.

3 *Logan Airside Improvements Planning Project Final EIS*, Section 4.2.3 PRAS Monitoring and Reporting, June 2002.

While Massport has implemented variations of all of these and additional measures at Logan Airport, Massport has never filed an official Part 150 noise compatibility study with the FAA because all of Logan Airport's program elements, while regularly reviewed and updated, preceded the promulgation of Part 150 and are effectively grandfathered under the regulation.

FAR Parts 91 and 161

When Congress adopted Public Law (PL) 101-508, subtitled the *Airport Noise and Capacity Act of 1990* (the Act), it required the U.S. Secretary of Transportation to:

- Establish a schedule for the phase-out of Part 36 Stage 2 aircraft by the year 2000.
- Establish a program for FAA review of all new airport noise and access restrictions limiting operations of Stage 2 aircraft.
- Establish a program for FAA review and approval of any restriction that limits operations of Stage 3 aircraft.

Part 91, mentioned earlier, set the schedule for conversion of Stage 2 aircraft to meet Stage 3 noise limits by December 31, 1999, but exempted aircraft less than 75,000 pounds maximum gross takeoff weight. This excluded, and still excludes, most business jets. Part 91 also permitted operators of the heavier aircraft to be retrofitted or operating manuals to be modified and the aircraft to be recertificated to meet minimum Stage 3 noise limits resulting in only minimal improvements in noise for some aircraft types. Though many of these aircraft have since been taken out of service voluntarily, primarily due to high operating costs, a few remain in the cargo and charter fleets operating at Logan Airport.

The other elements of the Act were addressed through FAR Part 161. It prescribes detailed benefit/cost analyses and notice requirements for an airport operator to follow if the operator wants to adopt a Stage 2 or Stage 3 noise or access restriction. Although several airports have embarked on such efforts in the past 16 years, only one, a general aviation (GA) airport (Naples Airport, Florida), has been found by FAA to have complied with Part 161 analysis, notice, and documentation requirements, for a ban on Stage 2 jet operations. Even in that particular case, however, FAA found the GA airport to be in violation of prior grant assurances.

Here, too, Massport benefits from early implementation of its Noise Rules. Promulgated in 1986, the Rules preceded the requirements of Part 161 and are grandfathered under the regulation. Future, more stringent amendments or alternative regulatory initiatives imposing noise or access restrictions on Stage 3 aircraft would likely require review and FAA approval under Part 161.

In 2006, Massport requested an opinion from the FAA regarding the pursuit of a Part 161 waiver. FAA informed Massport that a waiver or exemption from the requirements of Part 161 is not authorized under, or consistent with, federal statutory and regulatory requirements. A copy of FAA's letter to Massport was provided in *Appendix H, Noise Abatement* of the *2005 EDR*.

Logan Airport Noise Abatement Rules and Regulations

Massport's primary mechanism for reducing noise impacts from Logan Airport's operations is the Noise Rules. The Noise Rules were designed to reduce noise impacts by encouraging use of quieter aircraft; by requiring decreased use of noisier aircraft; and, by limiting nighttime activity by louder Stage 2 types. Many secondary goals aimed at limiting noise in specific areas also were stated.

Specific provisions of the Noise Rules, which continue to serve these goals, include:

- Limiting cumulative noise exposure at Logan Airport (as measured by Massport's Cumulative Noise Index or CNI) to a maximum of 156.5 EPNdB.
- Maximizing use of Stage 3 aircraft.
- Restricting nighttime operations by Stage 2 aircraft.
- Placing limitations on times and locations of engine run-ups and use of auxiliary power units.
- Restricting use of certain runways by noisier aircraft and time of day.

Noise Modeling Process

The DNL, CNI, and time above (TA) noise metrics reported annually by Massport provide various means of interpreting and comparing Logan Airport's complex noise environment from one year to the next. The noise context is influenced by numbers of operations, types of aircraft operating during the day and at night, use of various runway configurations, and the location and frequency of use of flight paths to and from the runways. Changes in any one of these operational parameters from one year to the next can cause changes in the values of the noise metrics and alter the shapes of the noise exposure contours that represent the accumulation of noise events during an average day.

Massport continues to make use of the state-of-the-art improvements in the noise modeling process, as described in the *2004 ESPR*. These developments in noise modeling technologies and techniques, which were employed in the preparation of the *2005 EDR, 2006 EDR* and this *2007 EDR* and will be used in future years, include:

- Continued use of the latest update to the FAA's Integrated Noise Model (INM), while retaining the unique capability to account for over-water sound propagation and hill effects at Logan Airport. The INM has been updated to INM Version 7.0 (INMv7.0). Massport's use of the latest FAA-approved version of the INM (INMv7.0), along with additional provisions approved by FAA to accommodate the Airport's unique water and terrain characteristics that have been shown through earlier technical studies to affect sound propagation into surrounding neighborhoods, has improved the modeling results. Logan Airport is the only airport in the world that incorporates these features into its approved modeling process.
- For 2007, all modeling included the use of digital terrain data. INMv6.2a and INMv7.0 both use improved terrain data allowing the model to evaluate each receptor location at its proper elevation, which enhances the accuracy of the results. The model had the ability to consider terrain before but the available terrain data was not as accurate as it is now.

- Continued use of a new radar data acquisition system known as a long-range PASSUR for the source of all radar-based operations data. The PASSUR system efficiently provides Massport with radar data to be more responsive to operational and noise issues at the Airport.
- Use of automated altitude profile and noise contour generation software. Massport purchased licenses to run two additional software packages, RealProfiles™ and RealContours™. The *2004 ESPR* included a comparative analysis of the results of the standard INM modeling approach with that of RealProfiles™ and RealContours™.
  - RealContours™ automates the production of noise contours directly from every individual radar trace. Approximately 391,607 traces were collected from the system and 351,049 traces retained enough information to be modeled in the RealContours™ system. Each radar trace was converted to an INM model track, ensuring that the lateral dispersion of radar tracks was retained in the modeling. The operations on these radar traces were then scaled to account for all of the 399,537 operations in 2007. This method also helps to develop more accurate noise contours by retaining the actual runway used and time of each operation.
  - RealProfiles™ analyzes each radar trace and develops altitude and performance profiles to be used by the model to ensure that the vertical dispersion of the radar tracks is retained in the modeling. A total of 298,588 flight tracks (85.0 percent) used these specially designed profiles.
- Use of radar data to determine the modeling profile for each of the 351,049 radar traces captured by Logan Airport's noise monitoring system. A profile was developed for each flight track departing from and arriving to each runway end to assure that the altitude profiles represented as accurately as possible the aircraft's performance during arrival or departure. This technique has been used since the *2004 ESPR* and improves the accuracy of each aircraft's modeled altitude over surrounding communities.
- Installation of an improved noise and operations monitoring system. Almost all of the noise monitoring terminals were operational for 2007. Combined with new software, this now gives the airport noise monitoring system the capability to correlate measured noise events with individual flight tracks. Refinements of the system are on-going and expected to be complete in 2008.

All of these enhancements are examples of Massport's continued commitment to improving the monitoring, reporting, and understanding the noise environment at Logan Airport. The following section of this chapter summarizes the basic operational data used to compute the DNL, CNI, and TA noise metrics reported for 2007.

Noise Model Inputs

The FAA's INMv7.0 was released for general use on 29 November 2006, and now replaces INMv6.2a, used in the *2006 EDR* as the primary analytical tool used to assess the noise environment at Logan Airport. The modeling also includes provisions for over-water sound propagation and hill effects that have been tailored to the local environment and approved by FAA's Office of Environment and Energy (AEE) based on previous special studies. Documentation of these features is included in earlier editions of EDRs and ESPRs. A technical comparison of the differences between INMv7.0 and INMv6.2a is included in *Appendix H, Noise Abatement*.

The INM requires detailed operational data as inputs for its noise calculations, including numbers of operations per day by aircraft type and by time of day, which runway for each arrival and for each departure, and flight track geometry for each track. These data are summarized in tables which follow or are included in *Appendix H, Noise Abatement*.
For this *2007 EDR*, Massport is continuing to use the new pair of software packages known as RealProfiles™ and RealContours™. They incorporate INMv6.2a and INMv7.0 as the computational engines for calculating noise, but they operate on individual flight tracks taken directly from radar systems rather than on consolidated prototype flight tracks used in reports prior to 2004. *Appendix H, Noise Abatement* provides a summary discussion of RealProfiles™ and RealContours™. The *2004 ESPR* described the software in detail, and evaluated the results with additional attention to detail sufficient to justify their use for subsequent ESPRs and EDRs.

The *2007 EDR* evaluated the noise environment utilizing both versions of the noise model. INMv6.2a was run with 2007 data which was compared to the noise contours presented in the *2006 EDR*. INMv7.0 was run for 2007 and compared to the 2007 INMv6.2a results to determine the extent attributable to the model changes.

INMv7.0 Improvements

INMv7.0 is the first full new release of the model since INMv6.0 in 1999. This version contains several enhancements to remain consistent with improvements and best practices in noise modeling. Some of these enhancements include implementation of new thrust reverser algorithms, new flight path segmentation algorithms, an updated aircraft database, and a new lateral attenuation adjustment model accounting for engine shielding during banked turns designed to more accurately predict noise for today's aircraft fleetmix. This version also fully supports helicopter noise modeling. As the most recently deployed FAA model, INMv7.0 results are the "official" data for the *2007 EDR*.

RealContours™ and RealProfiles™

This software incorporates the FAA-approved INMv6.2a and INMv7.0 as the computational engine for calculating noise, but provides greater detail through the uses of individual flight tracks taken directly from radar systems rather than relying on consolidated, representative flight tracks data.

RealContours™ improves the precision of modeling by:

- Directly converting the radar flight track for every identified aircraft operation to an INM track, rather than assigning all operations to a limited number of prototypical or representative tracks.
- Modeling each operation on the specific runway that it actually used, rather than applying a generalized distribution to broad ranges of aircraft types.
- Selecting the specific airframe and engine combination to model, on an operation-by-operation basis, based on the published composition of the fleets of the specific airlines operating at Logan Airport.
- Using each aircraft's actual performance and altitude profile to develop inputs to the model which define the actual arrival or departure profile.

The following sections of this chapter provide an overview of the methodology and results associated with the more detailed analysis undertaken by Massport. *Appendix H, Noise Abatement* provides greater detail on both.

RealContours™ and RealProfiles™ Methodology

Standard INM methodology involves development of operational inputs and calculation of the DNL for a prototypical average annual day. This approach requires manually collecting, refining, and entering the enormous amount of data related to a full year of activity at an airport. For example, the model inputs may include an aircraft fleet mix with several dozen representative aircraft types, numerous representative flight tracks (on the order of 100 to 300 is common for an airport comparable to Logan Airport), and runway use and flight track use percentages for three or four categories of aircraft types with similar performance characteristics. These data are compiled and processed to determine annual average day input for the INM. The model then uses these input data to produce annual average day noise exposure contours and supplemental metrics.

Although the standard INM approach meets accepted professional standards, and reduces the effort and cost that would be associated with manually entering the parameters for every actual operation, it represents a significant simplification of the diversity of actual aircraft operations over a year. In addition, it does not take full advantage of the investment that Massport has made in installing and maintaining a state-of-the-art radar system,[4] which automatically collects flight track data and flight identification data for all operations at the Airport.

In contrast, RealProfiles™ and RealContours™ use each radar trace captured by Massport's noise monitoring system to compute noise exposure levels, population counts, and other indicators of the Logan Airport noise environment. RealContours™ uses INM to produce computations for each day of radar data and then compiles annual average noise exposure contours and supplemental metrics from each of the 360 days[5] of computations.

The following section summarizes the average-day operations for 2007 used in the noise modeling and compares them to similar data for 2006.

Fleet Mix

Beginning in 2001, significant improvements in radar data processing and analysis capabilities allowed Massport to rely more heavily on radar data as the primary source of input for noise calculations. Radar data typically are more accurate than the information reported by air carriers. These radar data typically result in a list of approximately 500 different aircraft types that use Logan Airport during a year, including the wide variety of small corporate jets and propeller aircraft flown by GA users, as well as the large passenger and cargo jets operated by air carriers.

For 2007, aircraft types at Logan Airport were matched to the INMv7.0 database, which contains individual noise and performance profiles for 253 different aircraft types, 138 of which represent civilian aircraft, the balance being military aircraft.[6] For those types showing up in radar data that are not in the INM's database, the radar type is paired with the best available alternative using a standard FAA-approved substitution list. The final list of modeled aircraft, used as an input to the INM, is presented in detail in *Appendix H, Noise Abatement*.

As in the past, operations by aircraft types have been summarized into several key categories: commercial (passenger and cargo) operations, Stage 2 or Stage 3 jet aircraft, and turboprop and propeller (non-jet) aircraft.

4 The Massport system utilizes the PASSUR™ product of Megadata Corporation and the data is processed using PREFlight™ from HMMH.
5 The PASSUR system supplied 360 days of useable radar data. The other 5 days were excluded due to a data failure. All modeling was adjusted to reflect 365 days.
6 Some of these are military types as well as older Stage 1 and 2 airplanes that no longer operate in the U.S. or do not use Logan Airport.

Table 6-1 Modeled Average Daily Operations by Commercial and General Aviation Aircraft[1,2]

		2004	2005	2006	2007
Commercial Aircraft					
Stage 2 Jets[3]	Day	0.03	0.05	0.03	0.03
	Night	0.01	0.01	0.00	0.01
	Totals	0.05	0.06	0.03	0.04
Stage 3 Jets (All)	Day	772.39	765.76	767.55	748.13
	Night	113.24	113.66	114.81	118.29
	Totals	885.63	879.42	882.36	866.42
Conventional Jets	Day	518.96	505.48	490.63	472.39
	Night	89.24	91.99	92.71	96.28
	Totals	608.20	597.47	583.34	568.66
Regional Jets	Day	253.43	260.34	276.95	275.77
	Night	24.00	21.68	22.11	22.03
	Totals	277.43	282.01	299.06	297.80
Non-Jet Aircraft	Day	133.24	148.77	140.81	145.27
	Night	3.03	3.02	3.26	3.47
	Total	136.28	151.79	144.07	148.73
Total Commercial Operations	Day	905.66	914.59	908.41	893.43
	Night	116.29	116.68	118.09	121.77
	Total	1021.95	1031.27	1026.51	1015.19
GA Aircraft					
Stage 2 Jets[3]	Day	0.94	2.29	1.90	1.24
	Night	0.14	0.25	0.17	0.19
	Total	1.08	2.54	2.07	1.43
Stage 3 Jets	Day	53.72	58.84	61.08	54.82
	Night	8.37	9.33	6.57	6.39
	Total	62.09	68.16	67.65	61.21
Non-Jets	Day	16.95	14.00	15.05	11.98
	Night	5.20	4.75	1.39	3.61
	Total	22.14	18.75	16.44	15.58
Total GA Operations	Day	71.60	75.12	78.03	68.04
	Night	13.71	14.33	8.13	10.19
	Total	85.31	89.46	86.15	78.22
Total	Day	977.27	989.71	986.43	961.46
	Night	130.00	131.02	126.22	131.96
	Total[3]	1107.26	1120.73	1112.66	1093.42

Source: Massport's Noise Monitoring System and Revenue Office numbers.
1 Includes scheduled and unscheduled operations.
2 Data for years prior to 2004 is available in *Appendix H, Noise Abatement.*
3 Stage 2 aircraft are exempt from meeting newer federal Stage 3 noise limits when their maximum gross takeoff weight is less than or equal to 75,000 pounds.

In addition, the operations are split into daytime and nighttime periods, where nighttime hours are defined as 10:00 PM to 7:00 AM, consistent with the definition of DNL. Table 6-1 summarizes the numbers of operations by categories of aircraft operating at Logan Airport in 2007 and includes similar data for 2006 and earlier years for comparison. Descriptions of Stage 2 and Stage 3 jet aircraft and nighttime operations follow the table.

Commercial Operations
Compared to 2006, the average daily operations counts from Table 6-1 indicate a decrease in air carrier activity, with overall commercial traffic decreasing by 1.6 percent in 2007. Modeled conventional air carrier jets (as opposed to regional jets, also known as RJs) decreased by 2.5 percent, while modeled commercial non-jet activity increased by 3.2 percent and modeled RJ operations decreased by 0.4 percent. Nighttime operations (between 10:00 PM and 7:00 AM) in 2007 increased 3.1 percent from 2006. Overall operations in 2007 remain well below historic peaks.

General Aviation Operations
Modeled GA activity exhibited a 9.2 percent decrease, from more than 86 daily operations in 2006 to just over 78 daily operations in 2007. Use of Stage 2 jets decreased by 30.9 percent with a 9.5 percent decrease in Stage 3 jets. Non-jet activity in 2007 was 5.2 percent less than in 2006, while nighttime operations (between 10:00 PM and 7:00 AM) in 2007 increased from 1.4 per night in 2006 to 3.6 per night in 2007.

Stage 2, Stage 3, and Stage 4 Jet Aircraft

Jet aircraft currently operating at Logan Airport are categorized by FAA into two groups: Stage 2 and Stage 3. As described previously, the designation refers to a noise classification specified in FAR Part 36 that sets noise emission standards at three measurement locations—takeoff, landing, and sideline—based on an aircraft's maximum certificated weight. The heavier the aircraft, the more noise it is permitted to make within limits.

The *Airport Noise and Capacity Act of 1990* (and its implementing regulations known as FAR Part 91), required operators of Stage 2 airplanes weighing more than 75,000 pounds to transition to Stage 3 aircraft by phasing out the older, noisier airplanes by December 31, 1999. Stage 2 aircraft weighing less than or equal to 75,000 pounds (most of them used in GA or for small commercial activities such as transporting checks between Federal Reserve Banks) are exempt from the phase-out deadline and have continued to fly after the December 31, 1999.

Because of the substantial differences in noise between Stage 2, recertificated Stage 3, and new Stage 3 aircraft, Massport tracks operations by these separate categories to follow their trends. Table 6-2 shows the percentage of commercial jet operations by stage category since 2004. One of the most significant changes occurring after the economic downturn in 2001 was the almost immediate retirement of the recertificated aircraft from airlines' fleets due to their high operating costs. In 2007, the proportion of commercial jets recertificated as Stage 3 continued to decrease to 1.1 percent. Newly manufactured Stage 3 aircraft remain consistent as a percentage of the commercial jet fleet, accounting for 98.9 percent of the commercial jet fleet in 2007.

Stage 4 aircraft will be entering the airlines' fleets in the next decade. The new Stage 4 noise standard applies to any new aircraft type designs requiring FAA approval after January 1, 2006. These new aircraft will have to produce a combined improvement in noise emission levels of at least 10 dB below the current Stage 3 limits at the three Part 36 measurement locations.[7] The International Civil Aviation Organization (ICAO) has already adopted a similar regulation for international operators, but neither the FAA nor ICAO has indicated any movement towards restricting the remaining recertificated Stage 3 aircraft from carrier fleets.

The pie charts presented in Figure 6-1 show the relative contributions of these aircraft groups to total commercial operations at Logan Airport compared to their contribution to total noise. The comparison illustrates the stronger-than-average influence that recertificated aircraft have on noise exposure, accounting for 2 percent of the commercial jet operations but creating approximately 10 percent of the noise exposure.

Table 6-2 Percentage of Commercial Jet Operations by Part 36 Stage Category[1]

	New Stage 3[2]	Recertificated Stage 3[3]	Stage 2	Total
2004	97.8%	2.2%	0.0%	100%
2005	98.0%	2.0%	0.0%	100%
2006	98.6%	1.4%[4]	0.0%	100%
2007	98.9%	1.1%[5]	0.0%	100%

Source: Massport and FAA radar data.

1 Data for years prior to 2004 is available in *Appendix H, Noise Abatement*

2 New Stage 3 aircraft are aircraft originally manufactured as a certified Stage 3 aircraft under FAR Part 36.

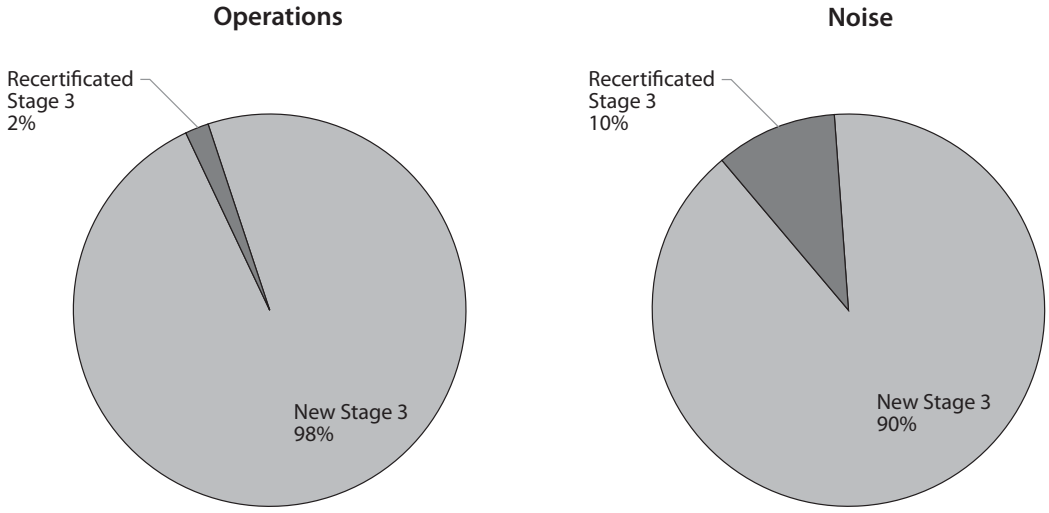
3 Recertificated Stage 3 aircraft are aircraft originally manufactured as a certified Stage 1 or 2 aircraft under FAR Part 36 which have been either treated with hushkits or have been re-engined to meet Stage 3 requirements.

4 The percentage of Recertificated Stage 3 aircraft decreased in 2006 due to DHL airways acquisition of Airborne, whose fleet contained only recertificated and no new Stage 3 aircraft. Refer to Table 6-13 for the entire breakdown of operations by carrier and percentage of Stage 3 aircraft.

5 Only five commercial carriers continue to use Recertified Stage 3 aircraft at Logan Airport (Capital Cargo International, Kitty Hawk, FedEx, DHL, and Northwest Airlines).

7 Federal Aviation Administration, *14 CFR Parts 36 and 91: Stage 4 Aircraft Noise Standards; Final Rule.* Federal Register, Vol. 70, No. 127, July 5, 2005.

Figure 6-1 Relative Contributions of Commercial Jet Operations and Noise at Logan Airport in 2007



Note: Noise calculations include the 10 dB nighttime penalty. There are not Stage 2 commercial operations.

Nighttime Operations

Although Stage 2 aircraft over 75,000 pounds have been banned since January 1, 2000, aircraft certified as Stage 2 which weigh less than 75,000 pounds have continued to operate in the U. S. Most Stage 2 aircraft involved in commercial operations in the U.S. fall into the category that has been banned. Stage 2 aircraft currently allowed to operate are small corporate jet size aircraft that are primarily in the GA fleet. However, there have been discussions regarding the development of a ban for these aircraft as well. Logan Airport's Noise Rules prohibit Stage 2 aircraft less than 75,000 pounds from using the Airport between the hours of 11:00 PM and 7:00 AM. Massport's noise monitoring system alerts Noise Abatement Office (NAO) staff of potential violations when they occur.

In addition, Massport takes note of flights that operate between the broader DNL nighttime period of 10:00 PM to 7:00 AM, when each flight is penalized 10 dB in calculations of noise exposure. Table 6-3 shows this nighttime activity by different groups of aircraft. Nighttime flights by commercial operators (jet and non-jet) increased by 3.1 percent, from 118.1 per night in 2006 to 121.8 per night in 2007. This continues the small increase that Logan Airport has experienced over the past three years. The majority of nighttime operations (between 10:00 PM and 7:00 AM) occurred either before midnight or after 5:00 AM. GA activity at night increased by 25.3 percent, from 8.13 per night in 2006 to 10.19 per night in 2007. These nighttime operations represent 12.1 percent of total operations at Logan Airport.

Table 6-3 Modeled Nighttime Operations (10:00 PM to 7:00 AM) at Logan Airport Per Night[1]

	Commercial Jets	Commercial Non-Jets	General Aviation[1]	Total
2004	113.26	3.03	13.71	130.02
2005	113.67	3.02	14.33	131.02
2006	114.83	3.26	8.13	126.22
2007	118.30	3.47	10.19	131.96
Change (2006 to 2007)	3.47	0.21	2.06	5.74
Percent Change	3.0%	6.4%	25.3%	4.5%

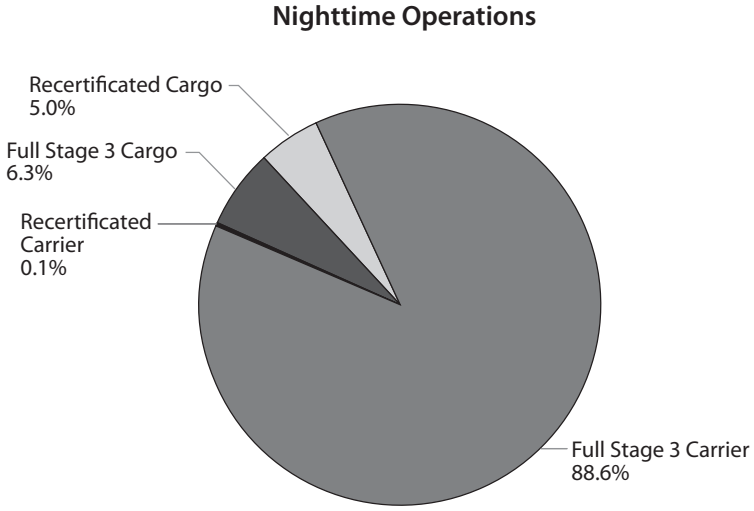
1 Data for years prior to 2004 is available in *Appendix H, Noise Abatement.*

Figure 6-2 breaks down the nighttime commercial activity by air carrier and cargo operators. It shows that recertificated cargo operations accounted for 5 percent of all nighttime operations in 2007, but because they are louder than newly manufactured Stage 3 aircraft, they contribute 13 percent of all nighttime noise by commercial operators. Other findings indicate:

- Although 5 percent of all night flights were flown by cargo operators using recertificated Stage 3 aircraft, those aircraft comprised 44 percent of the total nighttime operations flown by cargo operators during the year, a higher percentage of their fleet than that of passenger operators. In general, this is because the cargo fleet has a slower turn-over to newer, quieter aircraft, since cargo operators find it more cost-effective to retain their older and fully depreciated aircraft. However, this is an improvement over 2006 when 60 percent of nighttime cargo operations were in Recertificated Stage 3 aircraft.
- In comparison, passenger airlines only flew 0.1 percent of total night operations in Recertificated Stage 3 aircraft, and those flights comprised 0.1 percent of the total night flights by passenger operators; there are large numbers of new Stage 3 aircraft in the passenger aircraft fleets and they are deployed almost exclusively at night.

Though ICAO and the FAA are not expected to require the phase-out of the remaining recertificated operations prevalent among cargo operators, the use of these aircraft will decline in the future as these aircraft age. In the interim, Massport encourages and supports individual operators' voluntary efforts to undertake fleet conversions that eliminate recertificated aircraft.

Figure 6-2 Recertificated vs. New Stage 3 Commercial Nighttime Operations (2007)



Notes: Includes both jet and non-jet.
Stage 2 Day and Night operations contribute less than 1 percent of operations and noise.
Noise calculations include the 10 dB nighttime penalty.

Runway Use

Logan Airport's runways are shown in Figure 6-3. Runway use refers to the frequency with which aircraft utilize each of these runways during the course of the year, as dictated or permitted by availability, wind, weather, aircraft performance, demand, air traffic control conditions, and Preferential Runway Advisory System (PRAS) considerations. PRAS is a computer program that recommends to the FAA air traffic controllers, runway configuration options that will meet weather and demand requirements and provide an equitable distribution of the Airport's noise impacts on the surrounding communities. The more often a runway is used the greater the noise exposure in the communities adjacent to the end of the runway. Runway use conditions in 2007 were as follows:

- Overall the Airport continued to favor a north-south operating flow in 2007 as shown with the percentage of jet departures by operating direction in Figure 6-4. Within the north-west operating flow, departures on Runway 33L increased to 19 percent in 2007 from 6 percent in 2006. Departures decreased on Runway 9, Runway 27, and Runway 22R. Arrivals to Runway 33L decreased from 16 percent in 2006 to 11 percent in 2007. The use of Runways 33L and 27 in 2006 and 2007 is shown in Figure 6-5.
- Runway 14-32 is unidirectional, meaning that there are no arrivals to Runway 14 and no departures from Runway 32. Additionally, it can only be used during northwest wind conditions when winds are 10 knots or greater. Runway 14-32 opened in late November, 2006. The runway was used, as planned, primarily for arrivals of regional jets and turboprops over Boston Harbor in 2007, accounting for 2 percent of annual jet arrivals. Under certain northwest wind conditions, Runway 14-32 gives the FAA a second arrival runway thereby reducing delays at the Airport.
- For arrivals, there was also a decrease on Runway 4L and an increase on Runway 4R. For departures, there was an increase on Runway 4R and a decrease on Runway 9.

- Other runway use changes included Runway 27 arrivals increasing from 33 percent in 2006 to 36 percent in 2007. In addition, arrivals on Runway 4R increased from 29 percent to 31 percent. Runway 32 accounted for 2 percent of jet arrival activity during 2007.

The automated PRAS system was interrupted in February of 2004 (and remained down for all of 2005 and 2006) in order to replace the previous Automated Radar Terminal System (ARTS) radar with FAA's new Standard Terminal Automation Replacement System (STARS) radar and consolidate the Boston Terminal Radar Approach Control (TRACON) at the new facility in Merrimack, NH. The new PRAS system was installed in late 2006 and was used intermittently in 2007 as FAA and Massport evaluated its performance (refer to the discussion later on in this chapter).

Figure 6-3 Logan Airport Runways

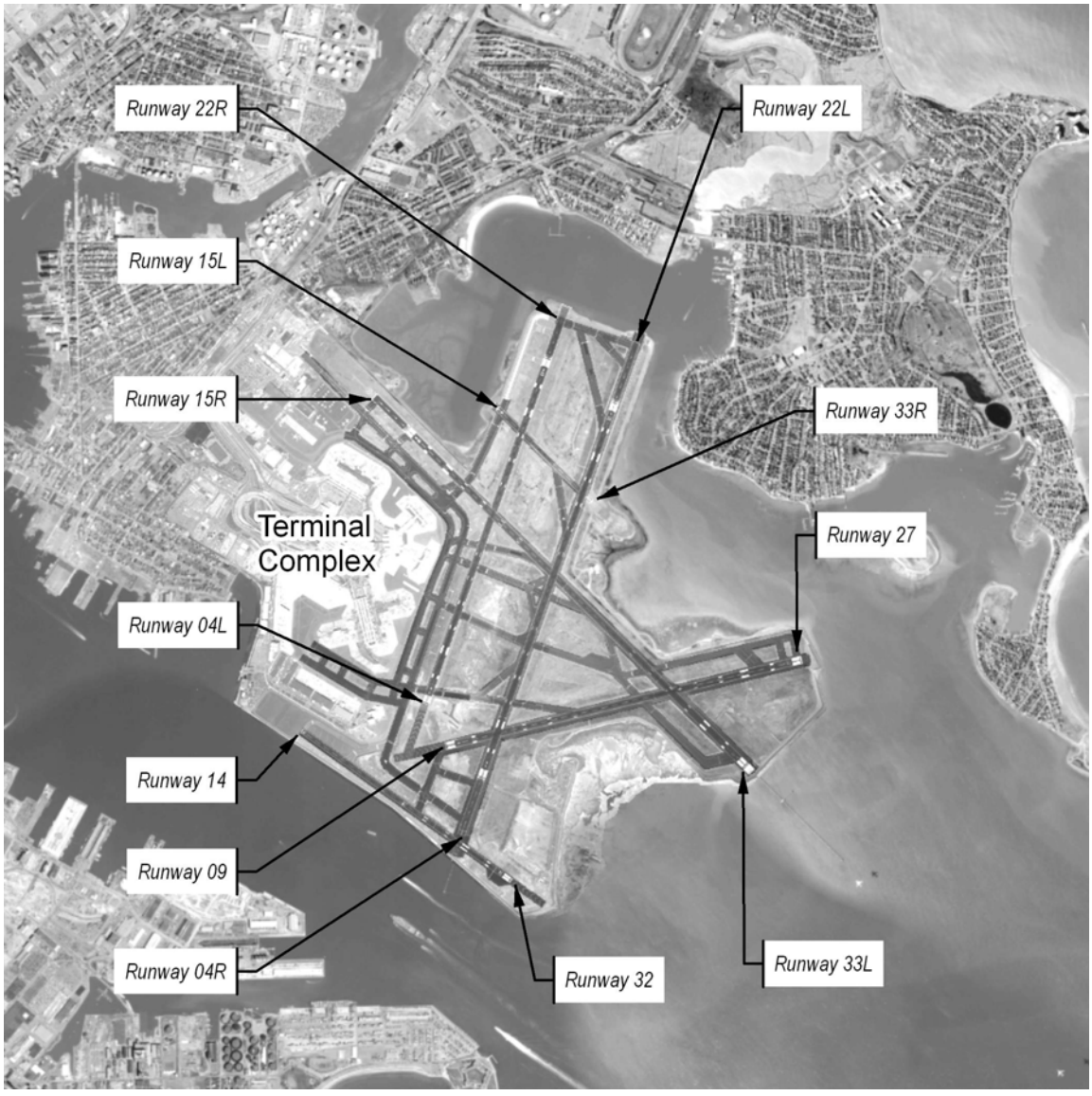


Table 6-4 presents consolidated annual runway use by jets. Since 2001, the radar data have been analyzed with Massport's PreFlight software. PreFlight is an analysis package used to assist in compiling fleet, day/night splits, and runway use information from radar data. Earlier data were derived from Massport's original noise monitoring system, supplemented with field records.

Table 6-4 Summary of Annual Jet Aircraft Runway Use[1]

	Runway									
	4L	4R	9	14[2]	15R	22L	22R	27	32[2]	33L
2004										
Departures	0%	5%	34%	NA	10%	4%	24%	18%	-	6%
Arrivals	6%	34%	0%	-	1%	12%	0%	24%	NA	23%
2005										
Departures	0%	5%	36%	NA	7%	1%	31%	13%	-	7%
Arrivals	8%	33%	0%	-	1%	11%	0%	29%	NA	17%
2006										
Departures	0%	4%	33%	<0.1%	3%	1%	40%	13%	-	6%
Arrivals	7%	29%	0%	-	1%	14%	0%	33%	0.2%	16%
2007										
Departures	0%	5%	31%	<0.1%	4%	1%	33%	7%	-	19%
Arrivals	5%	31%	0%	-	1%	15%	0%	36%	2%	11%

Source: Massport Noise Office.

Notes: The data reflect actual percentages of jet aircraft operations on each runway end. They should not be confused with effective runway use which is used by the PRAS to derive recommendations for use of a particular runway. Effective runway percentages include a factor of 10 applied to nighttime operations so that use of a runway at night more closely reflects its effect on total noise exposure.
Jet aircraft are not able to use Runway 15L or 33R due to its length of only 2,557 feet.
Values may not add to 100 percent due to rounding.

1 Data for years prior to 2004 is available in *Appendix H, Noise Abatement.*

2 Runway 14-32 opened in late November, 2006. (Runway 14-32 is unidirectional with no arrivals to Runway 14 and no departures from Runway 32).

NA Runway was not available.

Figure 6-4 Jet Departures by Operating Direction

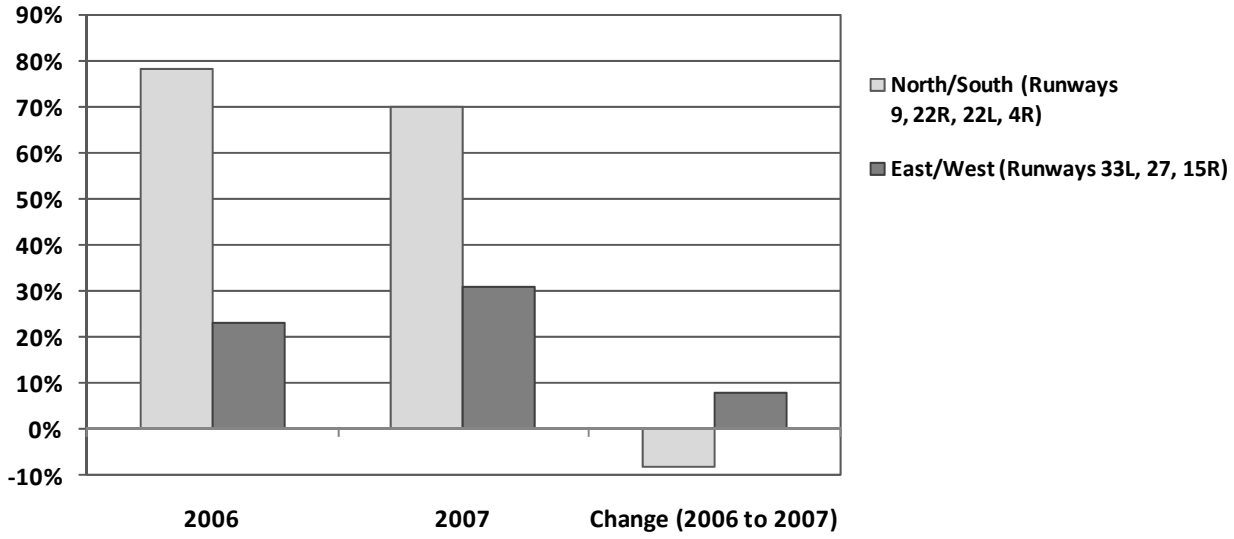
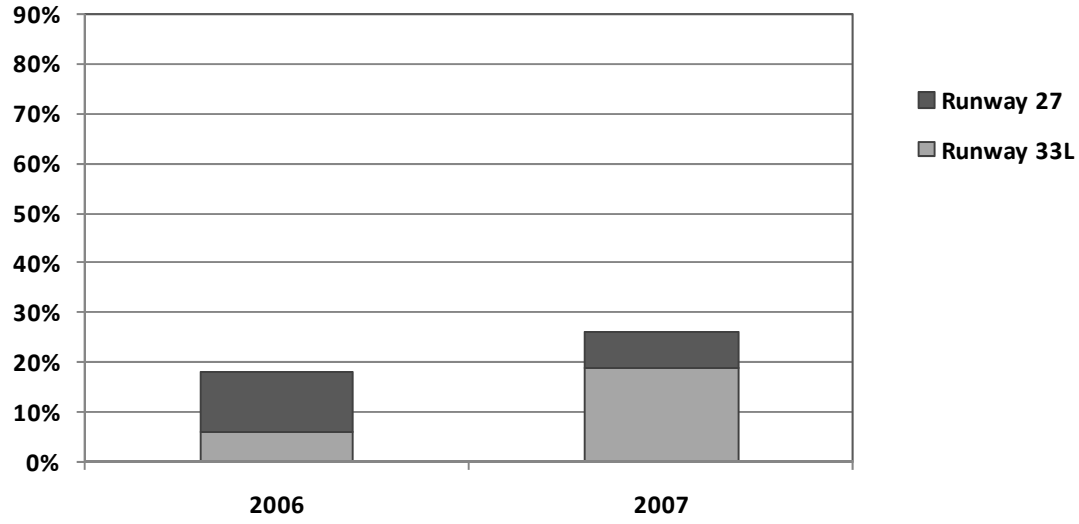


Figure 6-5 Runway 27 and 33L Usage in 2006 and 2007



Preferential Runway Advisory System

Developed in 1982 and enhanced in 1990 and subsequent years, the PRAS is a computer program that recommends to the FAA air traffic controllers runway configuration options that will meet weather and demand requirements and provide an equitable distribution of the Airport's noise impacts on surrounding communities. The primary objectives of the PRAS are to distribute noise in accordance with annual runway utilization goals, and to provide short-term relief from continuous operations over the same neighborhoods at the ends of the runways.

PRAS Compliance

Under the PRAS, each runway end has a specific annual utilization goal, defined separately for departures and arrivals. The goals are defined in terms of effective usage, which applies a factor of 10 to nighttime (10:00 PM to 7:00 AM) operations, equivalent to increasing nighttime exposure by 10 dB so that a change in effective utilization is roughly proportional to the change in DNL.

The PRAS computer was disabled in February 2004. This shutdown was necessary to accommodate the replacement of the previous ARTS radar at Logan Airport with the FAA's new STARS radar and the consolidation of the Boston TRACON at the new facility in Merrimack, NH. In 2007, updated PRAS software was installed. The update enhanced the ability to factor in PRAS considerations but did not change any of the PRAS goals. Massport and FAA have been working to ensure the reliability of the system.

Table 6-5 provides a comparison of effective runway use in 2007 to that of 2006, and to the PRAS goals. The 2007 utilizations shown in bold indicate improvements toward the goals for all runways. The effective jet runway use in 2007 has made progress towards the PRAS goals, primarily with departures. With the opening of Runway 14-32, there has been a shift in the use of some of the runways at Logan Airport. Departures from Runway 33L increased from 5.8 percent in 2006 to 17 percent in 2007 and were well above the goal of 11.9 percent. Arrivals to Runway 33L decreased, from 22.1 percent in 2006 to 18.6 percent in 2007.

Table 6-5 Effective Jet Aircraft Runway Use in Comparison to PRAS Goals

	PRAS Effective Usage Goals		2006 Effective Usage		2007 Effective Usage	
Runway End	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
4R/L	21.1%	5.6%	31.8%	3.8%	31.0%	4.2%
9	0.0%	13.3%	0.0%	30.3%	0.0%	28.1%
15R	8.4%	23.3%	1.0%	4.8%	0.8%	9.3%
22L/R	6.5%	28.0%	15.5%	41.7%	21.4%	32.6%
27	21.7%	17.9%	29.6%	13.6%	27.2%	8.7%
33L	42.3%	11.9%	22.1%	5.8%	18.6%	17.0%
14[1]	NA	NA	-	<0.1%	-	<0.1%
32[1]	NA	NA	0.1%	-	1.0%	-

Notes: PRAS goals are stated in terms of effective jet operations which exclude non-jet flights, but which multiply each nighttime (10:00 PM to 7:00 AM) operation by a factor of 10. PRAS goals have not yet been established for Runways 14 and 32.

1 Runway 14-32 opened in late November, 2006. (Runway 14-32 is unidirectional with no arrivals to Runway 14 and no departures from Runway 32).

Flight Tracks

From 1997 through 2001, Massport used a consistent set of 156 modeled flight tracks to represent prototypical flight corridors. Those tracks are documented in the *2001 EDR* and earlier Logan Airport annual reports. In 2002, the noise analysis expanded the number of tracks to 1,847 based on a full year of radar data. That process was documented in the *2002 EDR*.

Starting in 2004, the software package RealContours™ was used to develop the INM inputs. The new system uses every available radar track for modeling which has suitable data. This allows Massport to take into account runway closures and/or temporary airspace changes. Instead of using representative model tracks, RealContours™ converts each radar track to an INM model track and then models the scaled operation on that track. This method provides a one-to-one correspondence of radar tracks to model tracks and ensures that the lateral and vertical dispersion of aircraft types are consistent with the radar data.

Figure 6-6 provides a comparison of several arrival profiles for the same aircraft type (B757) using RealProfiles™ with the standard 3-degree approach used in the INM. The light green line is the 3-degree approach altitude profile and the other colored lines represent different flight profiles for actual B757 aircraft which were arriving on Runway 33L during nighttime hours. The dark green profiles (RC14) display a decent down to 3,000 feet where the aircraft flew level for several miles until the aircraft intercepted the 3-degree glide slope and followed that approach to the Airport. This use of special profiles is enhancing the accuracy of the modeling at locations away from the immediate Airport vicinity. Likewise, Figure 6-7 displays B747 aircraft departure profiles using RealProfiles™. These aircraft were departing from Runway 33L

For this report, 351,049 tracks were modeled to calculate the noise levels surrounding Logan Airport. Figures 6-8 through 6-13 provide a representative sample (all operations during September 2007) of flight tracks used with RealContours™ to develop the 2007 contours. The figures show arrivals and departures separately for each of three aircraft categories: air carrier jets, regional jets, and non-jets.

Figures 6-11 and 6-13, which display modeled arrivals for regional jets and non-jets during September 2007, present flight tracks utilizing the new Runway 14-32. Figure 6-13 also displays the harbor route for non-jet aircraft arriving to Runway 4L and 4R which initially follow the arrival route to Runway 15R.

Meteorological Data

The INM has several settings that affect aircraft performance profiles and sound propagation based on meteorological data. Meteorological settings include average annual temperature, barometric pressure, and relative humidity at the Airport. Massport obtained weather data for 2007 from the National Climatic Data Center (NCDC). Based on analysis of the NCDC data, the average annual conditions for 2007 are a temperature of 52.0 degrees Fahrenheit, sea level pressure of 30.00 in-Hg, and relative humidity of 63.2 percent. These values were used in the development of the 2007 noise conditions.

Figure 6-6 Modeled Arrival Profiles to Runway 33L for B757

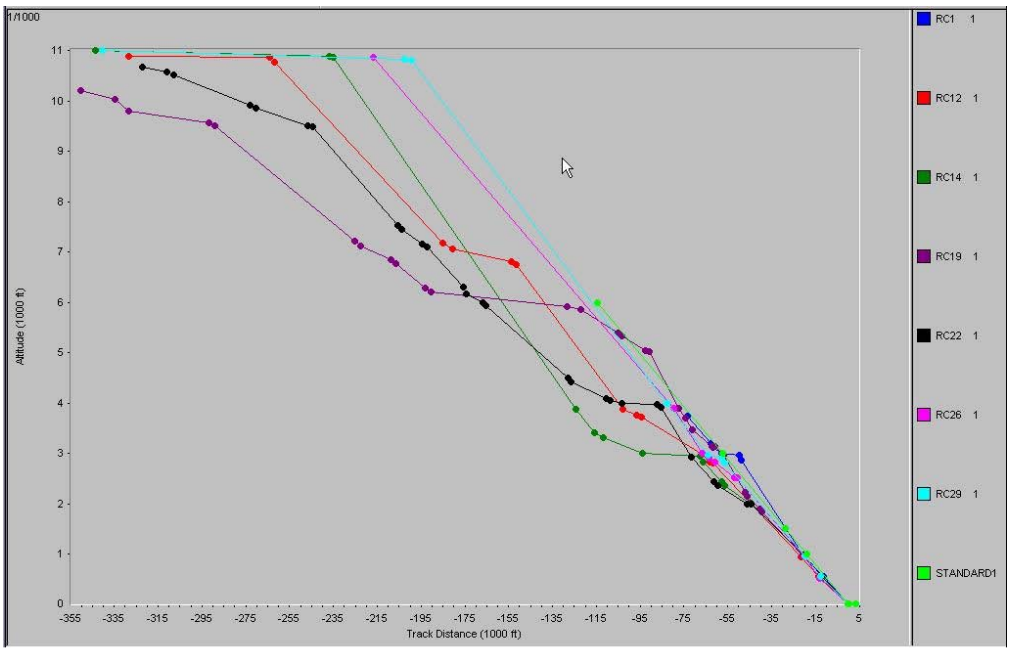


Figure 6-7 Modeled Departure Profiles from Runway 33L for B747

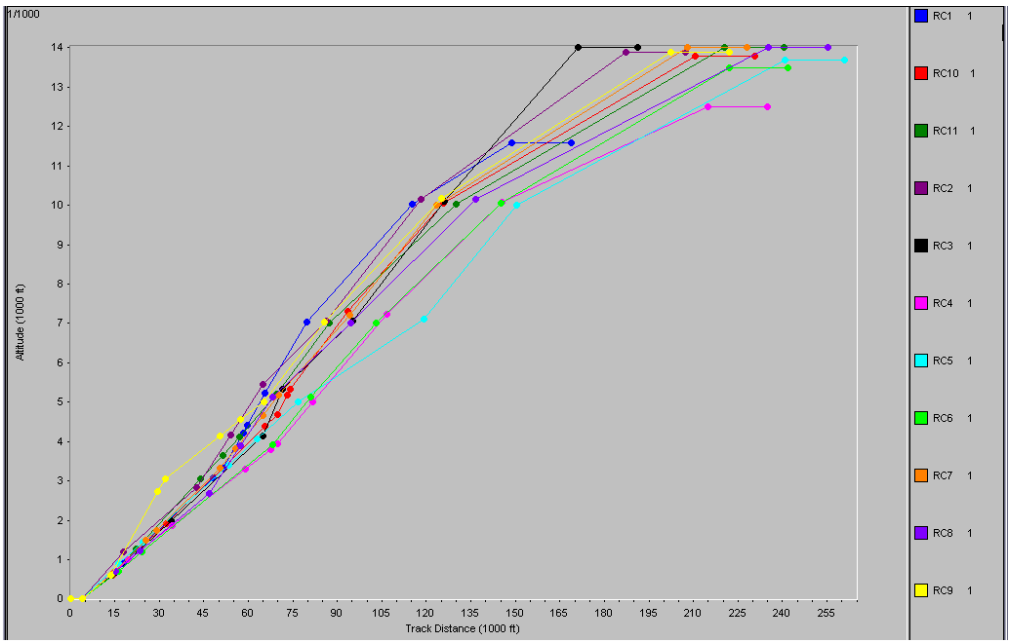


Figure 6-8 RealContours™ Air Carrier Departure Tracks (September 2007)

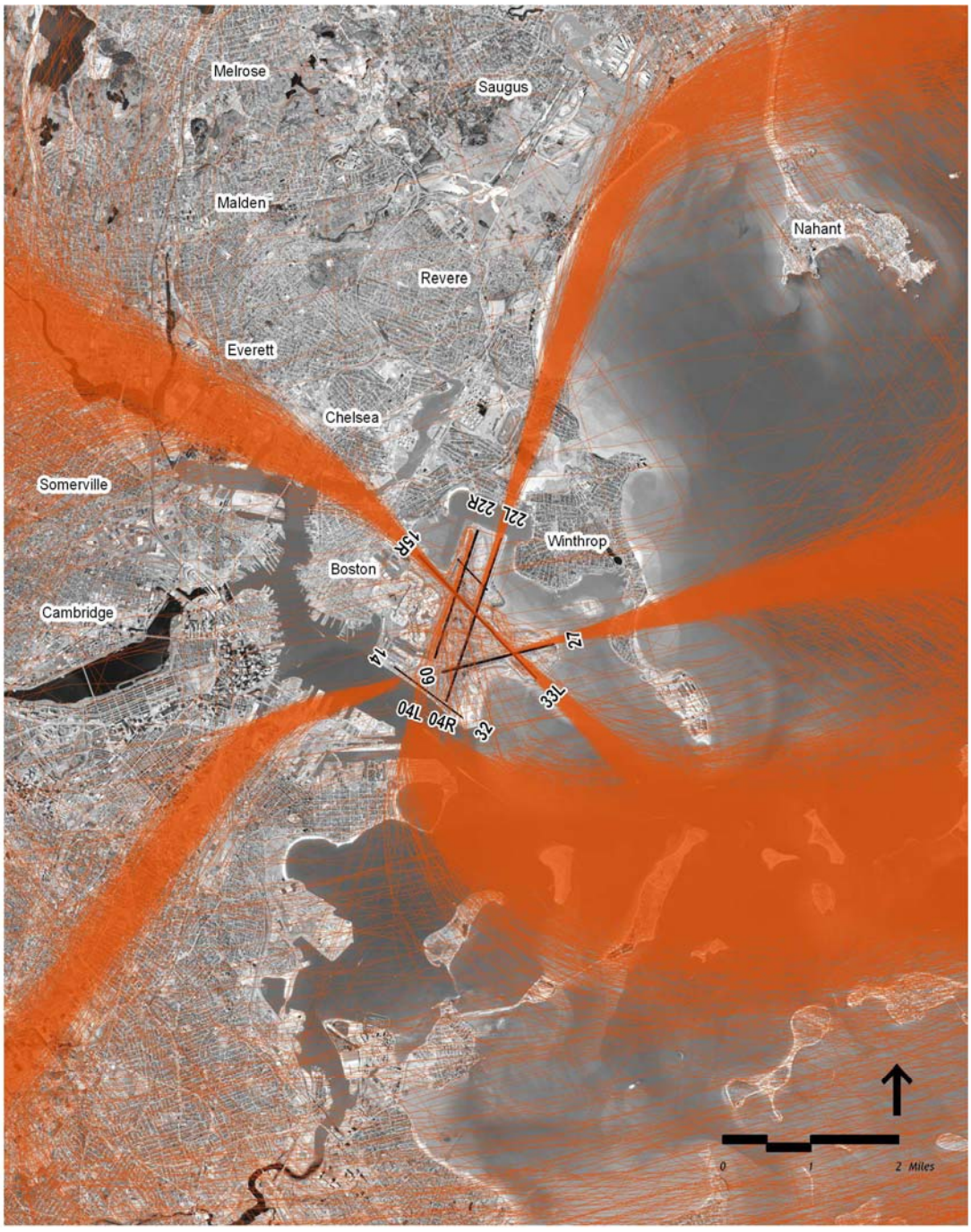


Figure 6-9 RealContours™ Regional Air Carrier Arrival Tracks (September 2007)

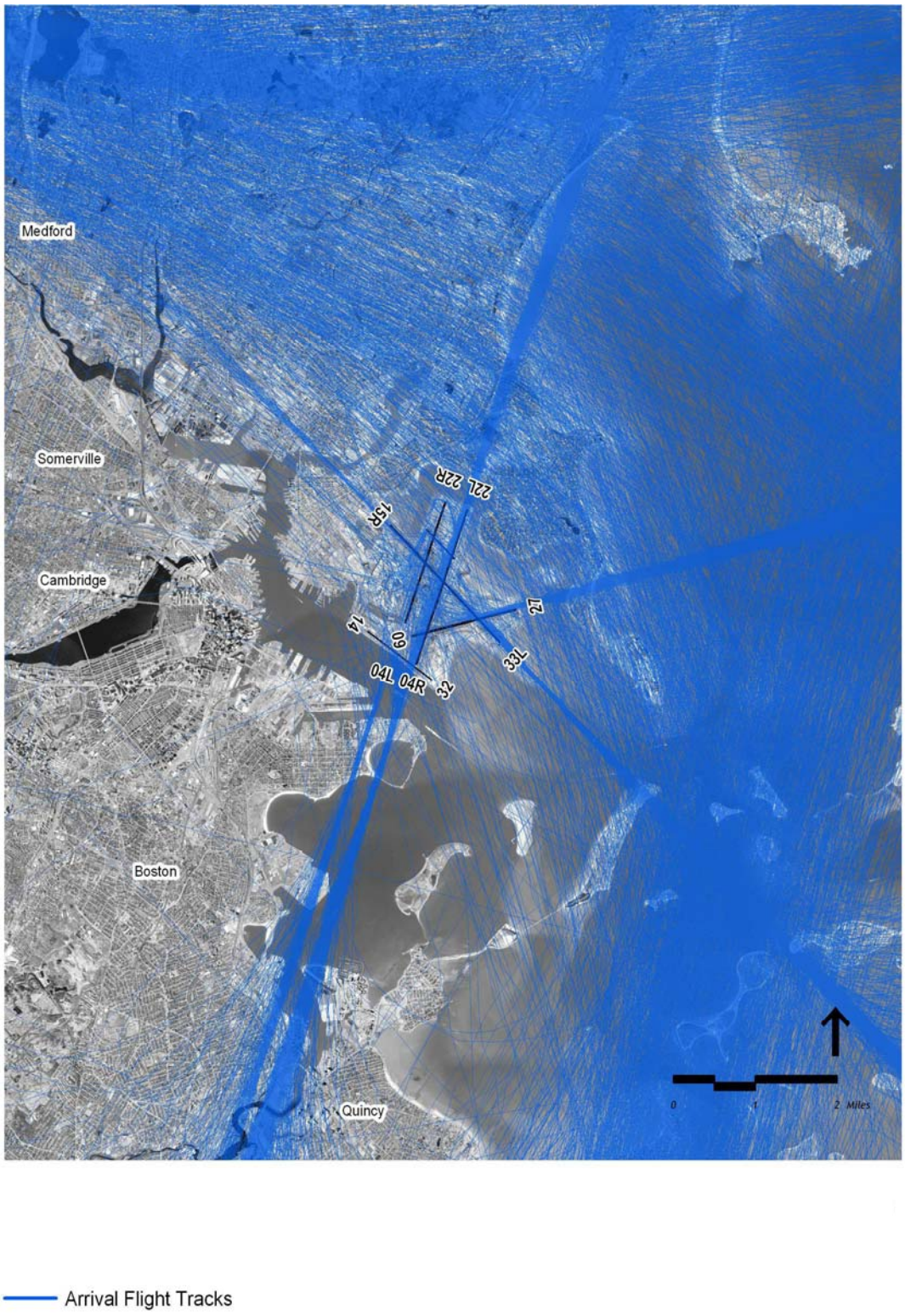


Figure 6-10 RealContours™ Regional Jet Departure Tracks (September 2007)

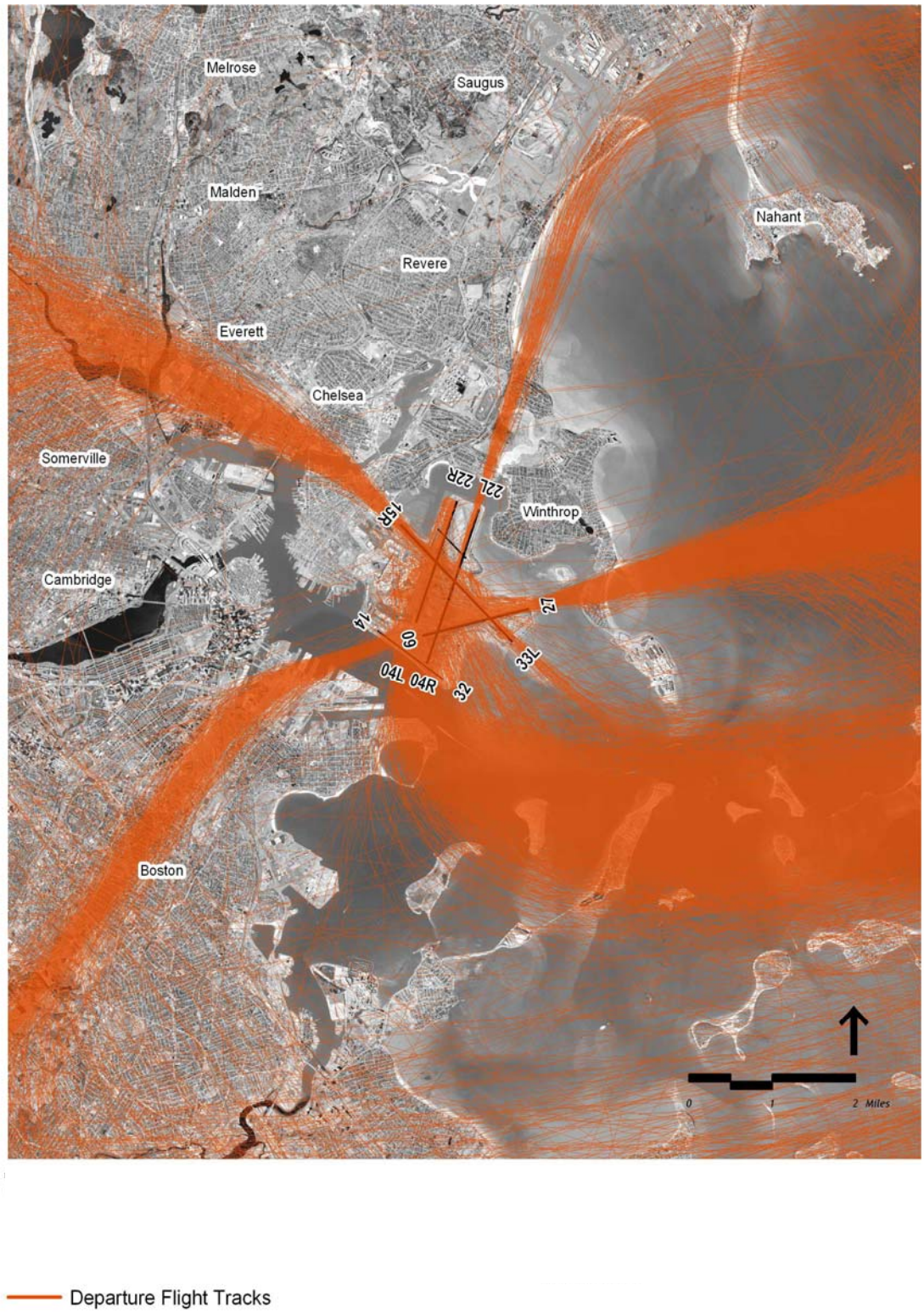


Figure 6-11 RealContours™ Regional Jet Arrival Tracks (September 2007)

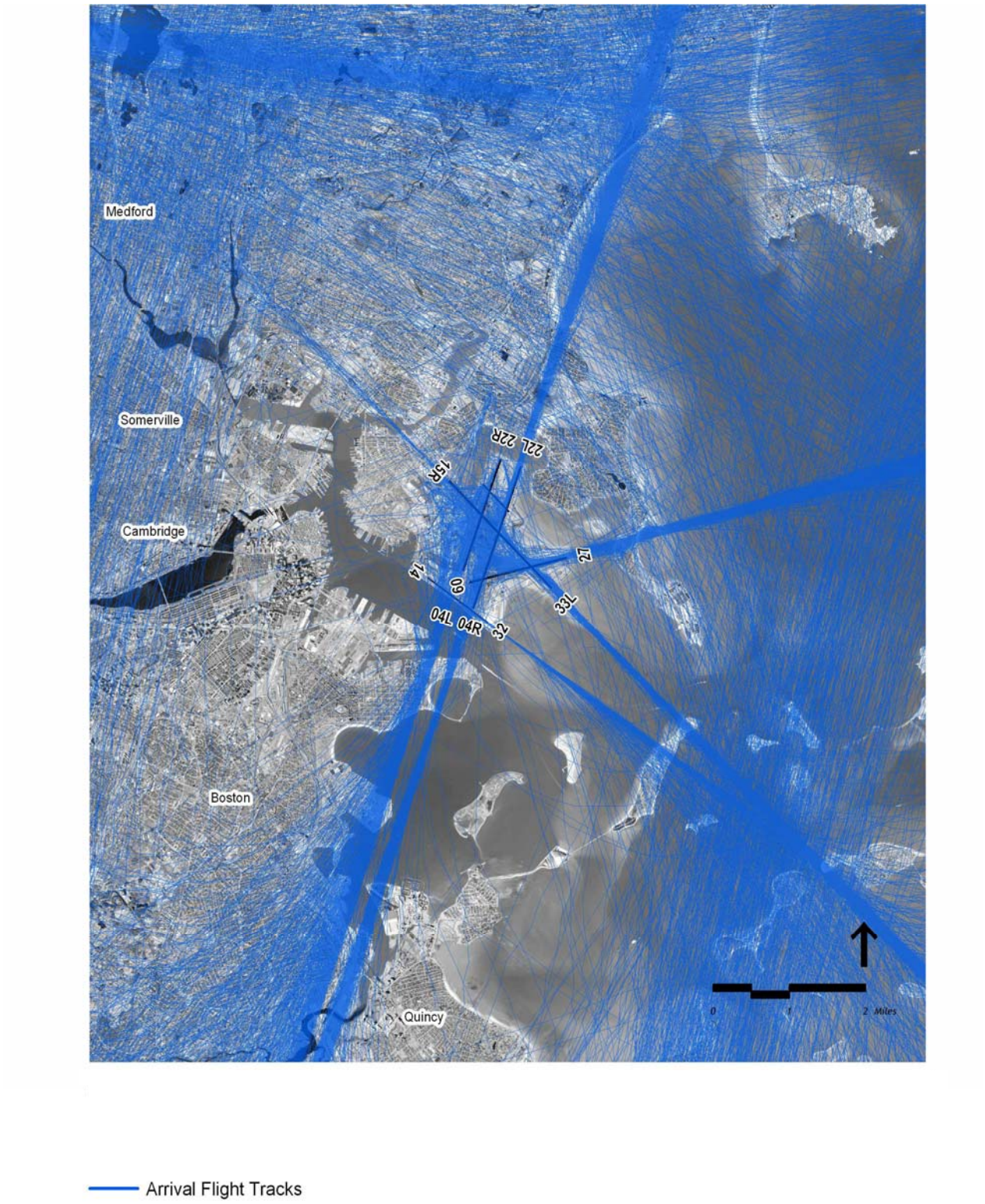


Figure 6-12 RealContours™ Non-Jet Departure Tracks (September 2007)

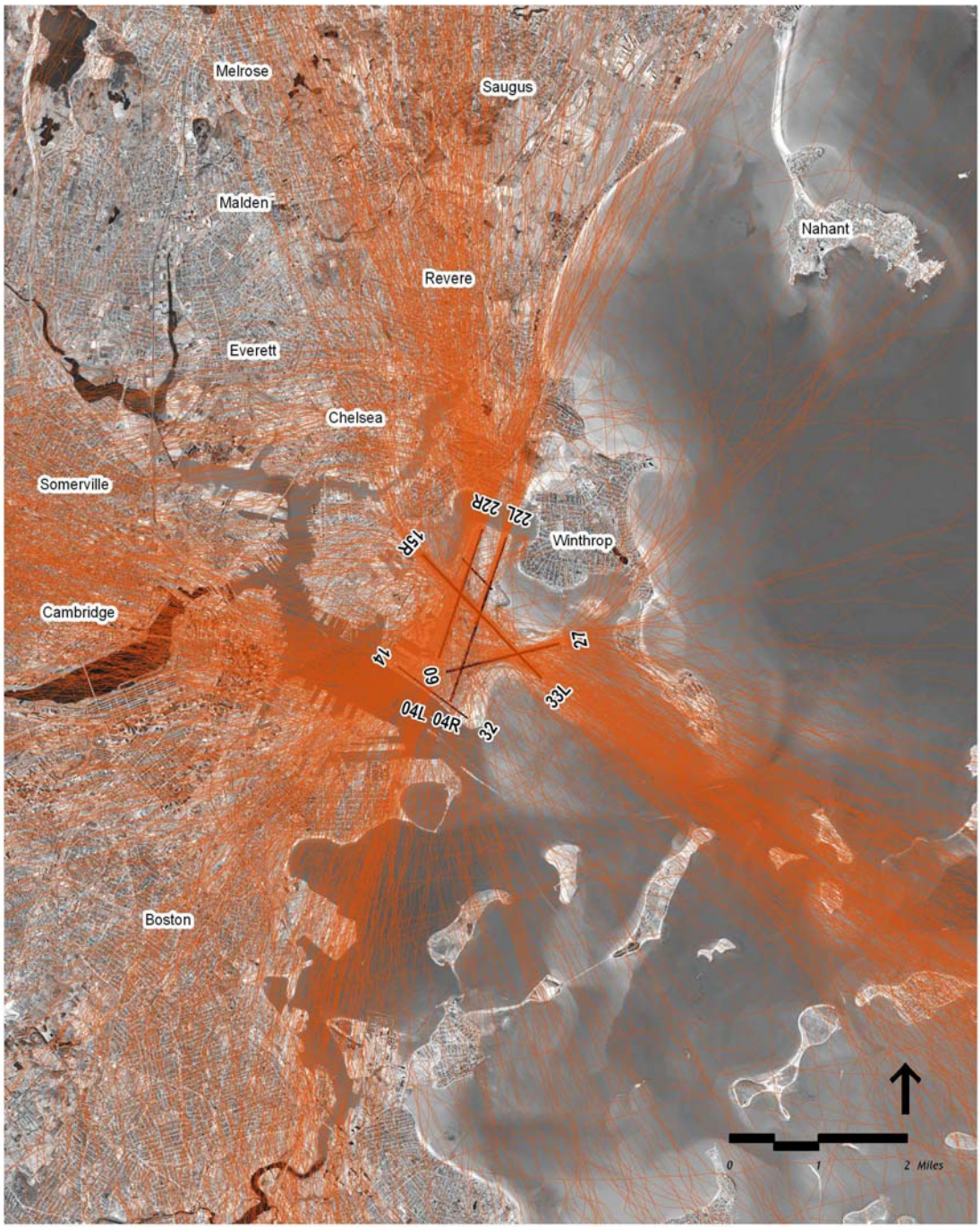
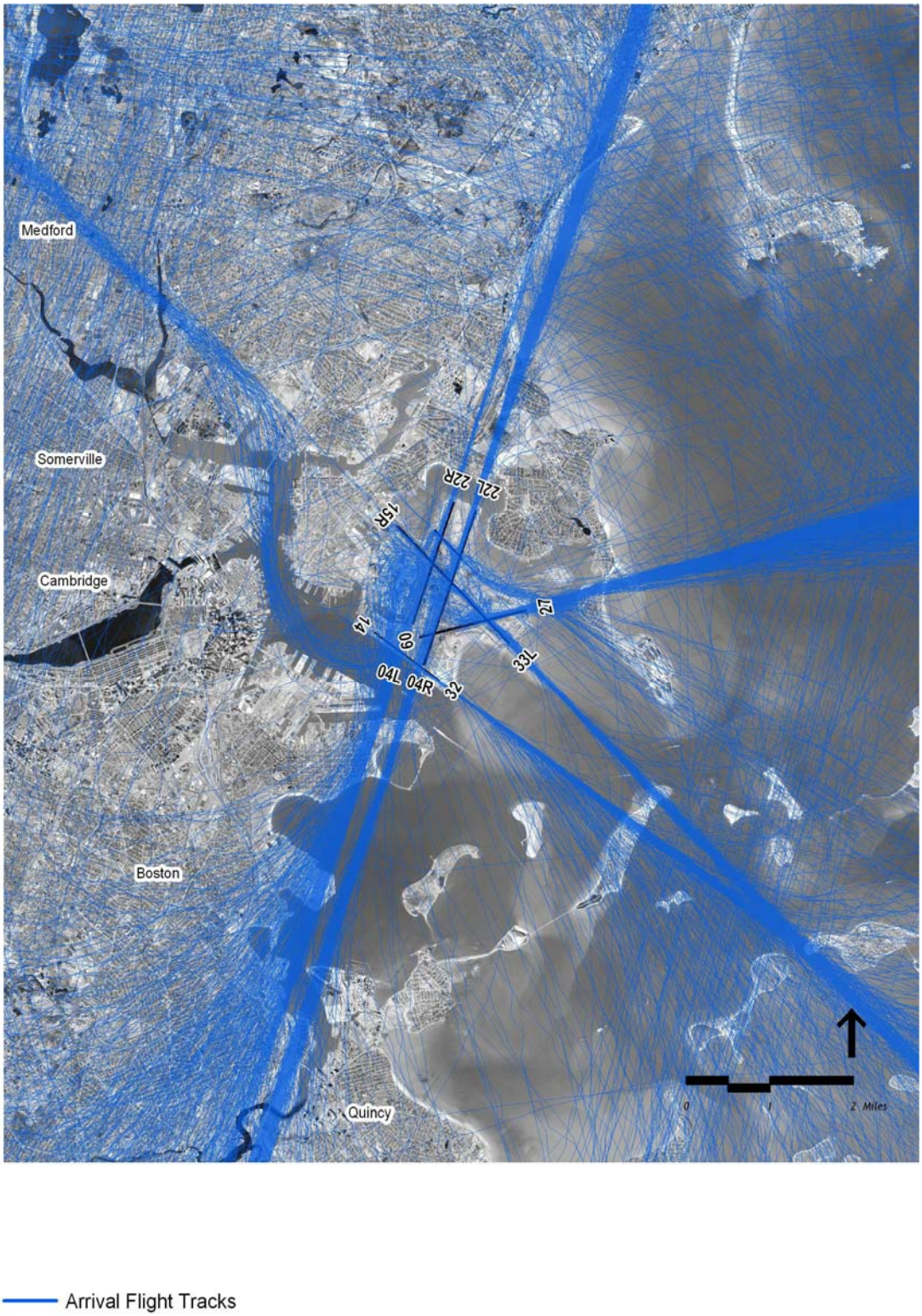


Figure 6-13 RealContours™ Non-Jet Arrival Tracks (September 2007)



2007 Noise Levels

Day-Night Noise Contours for 2007

The 2007 DNL contours were prepared using FAA's INMv7.0 and are shown in Figure 6-14 for DNL values of 60, 65, 70, and 75 dB. Figure 6-15 compares the 65 DNL contours for 2007 and 2006. Differences between these contours are explained by the operational differences from one year to the next as well as modeling improvements between INMv6.2a and INMv7.0, including the elimination of an adjustment applied to arriving aircraft at altitudes less than 100 feet because of improvements in the INM noise and performance database. Both the 2006 and 2007 contour sets include the FAA-approved adjustments to account for over-water sound propagation and hill effects in Orient Heights that are unique to Logan Airport. A more detailed discussion of model differences between INMv6.2a and INMv7.0 can be found in *Appendix H, Noise Abatement*.

The 65 dB DNL contour in the area of East Boston increased from 2006 to 2007, but decreased slightly in South Boston. The contour area also slightly decreased over Revere and Winthrop. All decreases are mainly attributable to improvements in the noise modeling for arriving aircraft.

The noise level increases in East Boston are attributable to shifts in runway use from 2006 to 2007. Despite these changes, the 65 dB DNL contour is within populated areas already sound insulated by Massport (refer to the Noise Abatement discussion presented later on in this chapter).

Population Impact Assessment

Population counts within selected 5 dB increments of exposure are reported each year to indicate how Logan Airport's noise environment changes over time from neighborhood to neighborhood. Population counts for 2007 are shown in Table 6-6 by community and are compared to previous years. Population counts since 2001 are based on U.S. Census data for 2000. Both the FAA and the U.S. Department of Housing and Urban Development consider DNL exposure levels above 65 dB to be incompatible with residential land use. Table 6-6 compares impacted populations each year, using the latest INM results. The noise analysis is always based upon the most recently FAA-approved INM (INMv7.0 for the 2007 noise analysis). Table 6-7 provides an additional breakdown of the estimated population in East and South Boston residing within the 65 dB DNL contour.

Figure 6-14 65-75 dB Contours for 2007 Operations Using INM v7.0

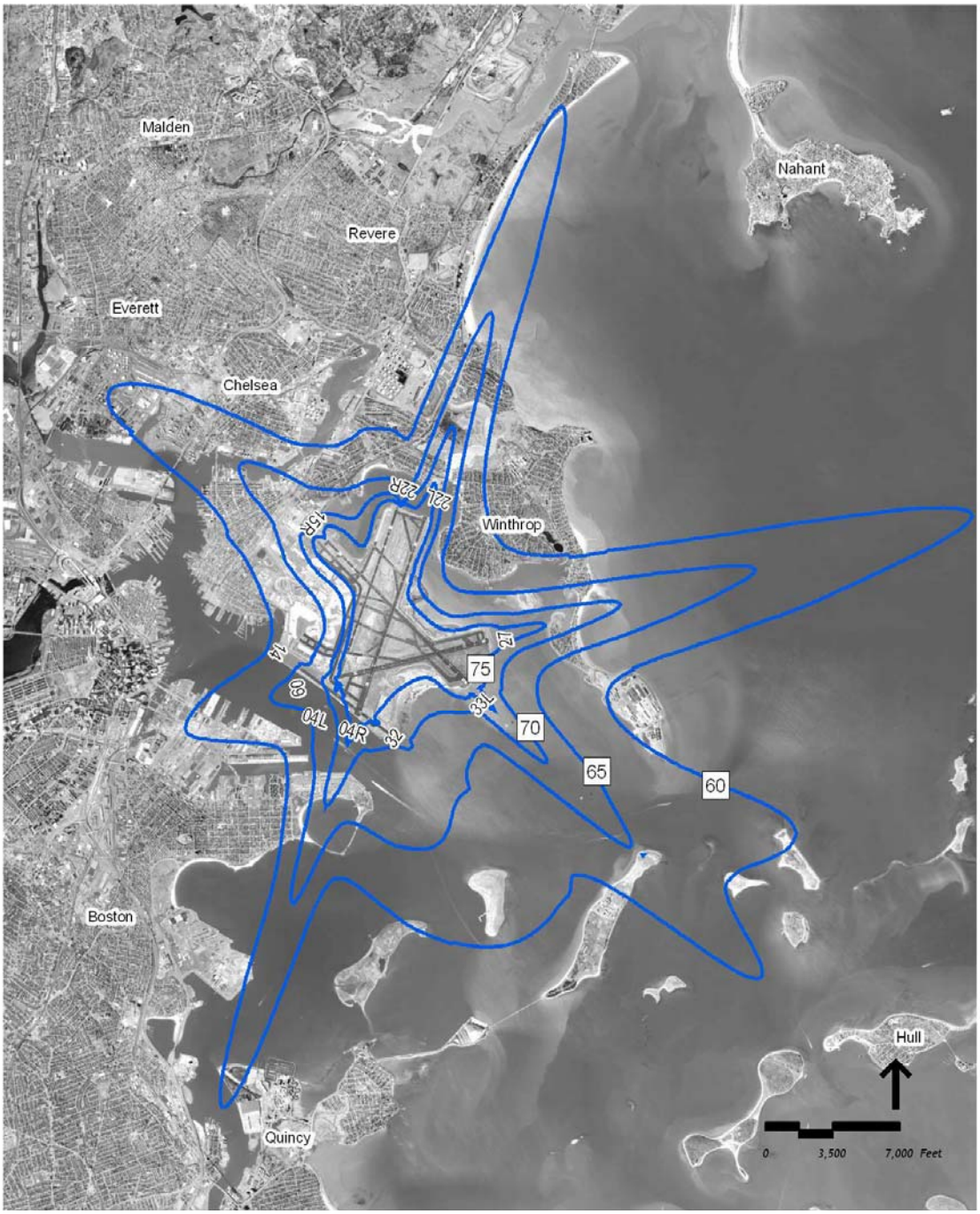


Figure 6-15 Comparison of the 65 dB DNL Contours for 2006 Operations Using INM v6.2a and 2007 Operations Using INM v7.0

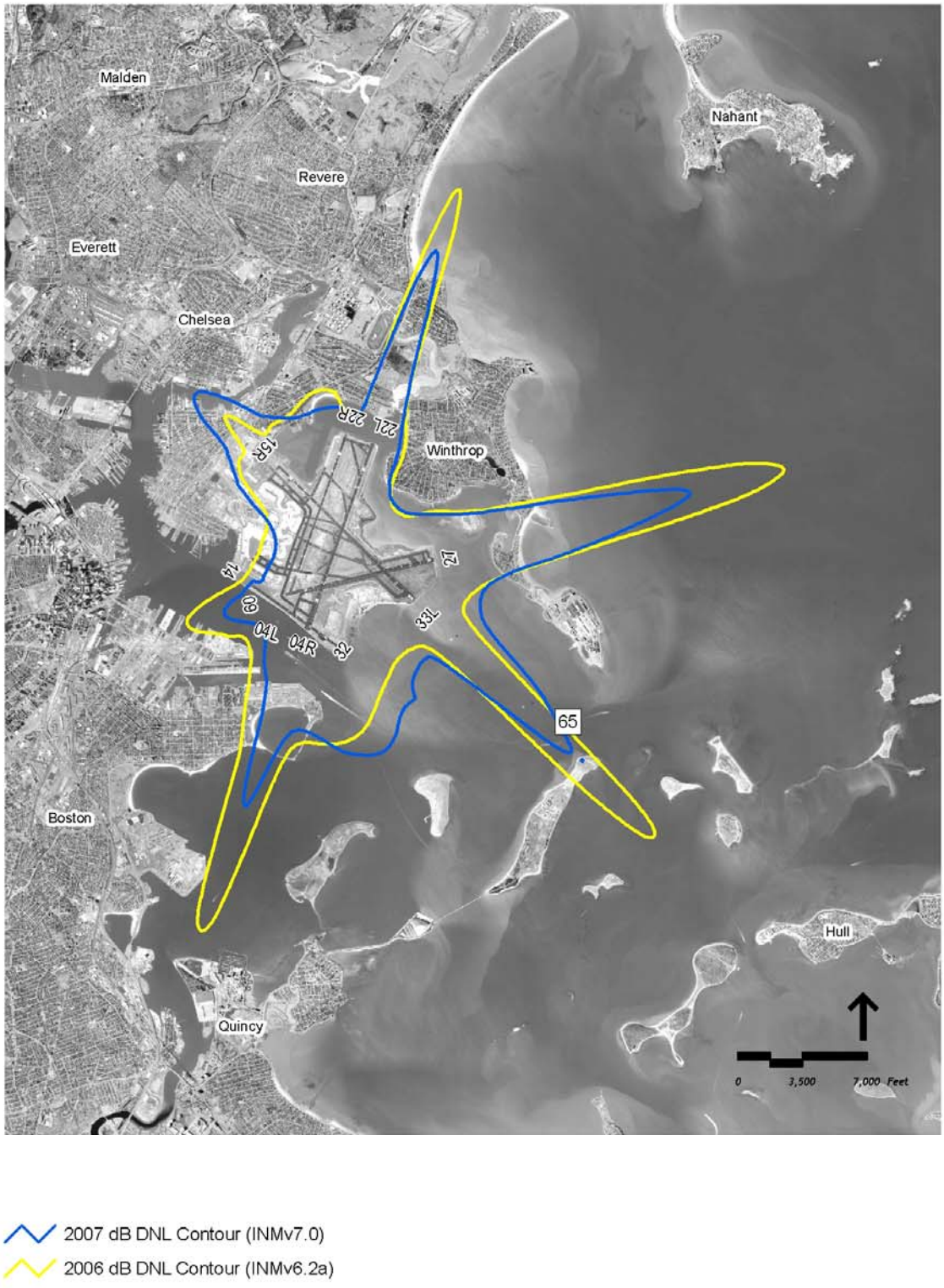


Table 6-6 Noise-exposed Population by Community[1]

Boston							Revere						
Year	80+ DNL	75-80 DNL	70-75 DNL	65[2]-70 DNL	Total (65+)[2] DNL	Census Base	Year	80+ DNL	75-80 DNL	70-75 DNL	65[2]-70 DNL	Total (65+)[2] DNL
2004	0	65	192	4,142[3]	4,399[3]	2000	2004	0	0	82	2,969	3,051
2005	0	65	104	2,020[3]	2,189[3]	2000	2005	0	0	82	2,540	2,622
2006	0	65	99	1,054[3]	1,218[3]	2000	2006	0	0	82	2,540	2,622
2007 (INMv6.2a)	0	0	169	4,113[3]	4,282[3]	2000	2007 (INMv6.2a)	0	0	0	2,457	2,457
2007 (INMv7.0)	0	0	169	3,586[3]	3,755[3]	2000	2007 (INMv7.0)	0	0	0	2,450	2,450

Chelsea							Winthrop						
Year	80+ DNL	75-80 DNL	70-75 DNL	65[2]-70 DNL	Total (65+)[2] DNL	Census Base	Year	80+ DNL	75-80 DNL	70-75 DNL	65[2]-70 DNL	Total (65+)[2] DNL
2004	0	0	0	0	0	2000	2004	0	2	337	1,649	1,988
2005	0	0	0	0	0	2000	2005	0	39	347	1,280	1,666
2006	0	0	0	0	0	2000	2006	0	39	416	1,288	1,743
2007 (INMv6.2a)	0	0	0	0	0	2000	2007 (INMv6.2a)	0	0	247	1,191	1,438
2007 (INMv7.0)	0	0	0	0	0	2000	2007 (INMv7.0)	0	0	247	1,139	1,386

Everett							All Communities					
Year	80+ DNL	75-80 DNL	70-75 DNL	65[1]-70 DNL	Total (65+)[1] DNL	Census Base	Year	80+ DNL	75-80 DNL	70-75 DNL	65[2]-70 DNL	Total (65+)[2] DNL
2004	0	0	0	0	0	2000	2004	0	67	611	8,760[3]	9,438[3]
2005	0	0	0	0	0	2000	2005	0	104	533	5,840[3]	6,477[3]
2006	0	0	0	0	0	2000	2006	0	104	597	4,882[3]	5,583[3]
2007 (INMv6.2a)	0	0	0	0	0	2000	2007 (INMv6.2a)	0	0	416	7,761[3]	8,177[3]
2007 (INMv7.0)	0	0	0	0	0	2000	2007 (INMv7.0)	0	0	416	7,175[3]	7,591[3]

Notes: Measured in decibels (dB).
Population counts for 2004 through 2007 are based on the 2000 U.S. Census data.
2004 through 2007 results are from the RealContours™ system.

1 Data for years prior to 2004 is available in *Appendix H, Noise Abatement.*

2 65 dB DNL is the federally-defined noise criterion used as a guideline to identify when residential land use is considered incompatible with aircraft noise.

3 These values reflect the effect of the FAA-approved terrain adjustment in Orient Heights.

Table 6-7 Estimated Population within 65 dB[1] DNL Contour[2]

	2000 Census Base						Change	
	2004	2005	2006 (INMv6.2a)	2007 (INMv6.2a)	Operational Changes (2006 INMv6.2a to 2007 INMv6.2a)	2007 (INMv7.0)	Model Changes (2007 INMv6.2a to 2007 INMv7.0)	Total Changes (2006 INMv6.2a to 2007 INMv7.0)
Boston								
East Boston	4,399	2,155	1,184	4,282	3,098	3,755	-527	2,571
South Boston	0	34	34	0	-34	0	0	-34
Boston total	4,399 [3]	2,189 [3]	1,218 [3]	4,282[3]	3,064	3,755	-527	2,537
Chelsea	0	0	0	0	0	0	0	0
Revere	3,051	2,622	2,622	2,457	-165	2,450	-7	-172
Winthrop	1,988	1,666	1,743	1,438	-305	1,386	-52	-357
Everett	0	0	0	0	0	0	0	0
All Communities	9,438	6,477	5,583	8,177	2,594	7,591	-586	2,008

Notes: Population counts for 2004 through 2007 are based on the 2000 U.S. Census data.
2004 through 2007 results are from the RealContours™ system.

1 65 dB DNL is the federally-defined noise criterion used as a guideline to identify where residential land use is considered incompatible with aircraft noise.

2 Data for years prior to 2004 is available in *Appendix H, Noise Abatement.*

3 These values reflect the effect of the FAA-approved terrain adjustment in Orient Heights.

The changes between 2006 and 2007 shown in Tables 6-6 and 6-7 are due to both airport operation changes and model improvements. Overall changes in fleet mix (small increase in commercial non-jet operations, increase in larger RJ operations, and a decrease in Boeing 727 operations in 2007) and runway use between 2006 and 2007 increased the total number of people within the 65 dB DNL contour to 8,177, an increase of 2,594. The number of people within the 65 dB DNL contour increased in East Boston but decreased slightly in South Boston, Revere, and Winthrop. However, improvements in the FAA noise model reduced the population estimated within 65 dB DNL contour from 8,177 to 7,591 for 2007, a reduction of 586 people. Improvements to the FAA model comprise improvements in start of takeoff roll noise calculations (responsible for reducing the number of people within the 65 dB DNL contour in East Boston) and improvements in the lateral attenuation algorithm (responsible for reducing the number of people within the 65 dB DNL contour in Revere and Winthrop). Overall, the total number of people within the 65 dB DNL contour increased by 2,008 in 2007 compared to 2006.

Comparing Measured and Modeled Noise Levels

When changes in exposure are predicted by the INM, it is important to substantiate these findings; noise measurements are often used for this purpose. Massport's permanent noise monitoring system provides this capability. The system continuously measures the noise levels at each of 30 microphone locations around the Airport and environs, as shown in Figure 6-16. During normal operation, noise monitors at the microphone locations measure hourly noise exposure levels as well as a variety of metrics associated with individual noise events that exceed preset threshold sound levels. Noise monitoring data are transmitted back to Massport's Noise Office, where daily DNL values and other noise metrics are computed for each location and summarized in various reports.

Figure 6-16 Noise Monitor Locations



Prior to 1997, Logan Airport Generic Environmental Impact Reports (GEIRs) and Annual Updates (now ESPRs and EDRs) compared the measured annual average DNL values from the monitors to INM-computed values of DNL at each of the specific noise monitor sites to check for reasonableness. Many sites produced small differences between measurements and predictions, particularly as adjustments were incorporated into the modeling process to account for the over-water sound propagation and hill effects. However, results at more distant locations have often produced significant differences of 10 or more dB, especially at measurement sites where DNL values were often less than 60 dB. In 2007, with the Airport's new noise monitoring system and its ability to correlate measured noise events with individual flight tracks, combined with the improvements in the INM database, differences between measured and modeled values have narrowed from the values that have appeared in past reports.

One of the major factors contributing to these differences was that the measured levels included aircraft as well as community-based noise sources in the vicinity of the monitor, while the INM-computed levels included the noise only from aircraft. This tended to result in measured levels that are higher than modeled values at certain locations. As a result, beginning at the end of 1997, Massport enhanced its noise monitoring system to separate aircraft noise events from other sources to produce aircraft-only DNL values in addition to the total DNL values it previously acquired. The monitoring system's ability to distinguish aircraft from community-based noise sources now results in a better comparison of measured and modeled noise levels.

A second factor identified as potentially contributing to the differences between measured and modeled DNL values (especially at the more-distant noise monitoring sites) is aircraft altitude. Typical noise modeling uses distance from origin to destination to determine the appropriate climb profile for an aircraft; however, many aircraft climb more slowly than the standard profiles would suggest, especially if the pilot must make a turn shortly after takeoff. Thus, beginning with the *2002 EDR*, Massport enhanced the modeling process by using radar data from its monitoring system to determine the best available climb profile (see *Appendix H, Noise Abatement*). RealProfiles™ further enhances this process by modeling the actual climb profile instead of selecting the best fit among a standard set. This technique resulted in modeling lower altitudes over many of the farther-out monitoring sites, reducing the differences between measured and modeled sound levels at those locations.

Finally, latitudes and longitudes of each measurement site were verified by survey and their exact coordinates entered into the INM. These improvements in modeling techniques are now fully integrated into the measured-versus-modeled (INM) comparisons that follow.

Table 6-8 compares the measured 2006 DNL values at each measurement site to the measured 2007 DNL values. 2007 is the first year of measured results from the new Noise Monitoring System (NOMS). As seen in Table 6-8, measured sound levels decreased at almost all locations. This is due to improved measurement equipment, improved flight tracking and improvements in the aircraft event detection in the new NOMS system. Three sites (Site 18, 25, and 29) have decreases greater than 10 dB. A portion of this reduction may be due to decreases in noise in these areas but total measured noise at these sites did not experience any significant decrease. For example, the total measured noise level (community and aircraft noise levels combined) at Site 29 for 2006 was 61.0 dB and for 2007 60.6 dB but the Aircraft-only level decreased from 55.4 dB to 43.4 dB in 2007.

Table 6-8 Comparison of Measured DNL Values From 2007 to 2006

Location	Site	Distance from Logan Airport (miles)	2006 Measured Aircraft – Only (DNL)	2007 Measured Aircraft - Only (DNL)	Difference - 2007 vs. 2006
Winthrop – Bayview and Grandview	4	1.6	74.5	73.1	(1.4)
Winthrop – Harborview and Faun Bar	5	1.9	67.1	64.8	(2.3)
Winthrop – Somerset near Johnson	6	0.8	65.9	65.4	(0.5)
Winthrop – Loring Road near Court	7	1.0	69.5	68.9	(0.6)
Winthrop – Morton and Amelia	8	1.6	62.2	61.2	(1.0)
East Boston – Bayswater near Annavoy	9	1.3	71.3	69.8	(1.5)
East Boston – Bayswater near Shawsheen	10	1.3	64.2	64.4	0.2
East Boston – Selma and Orient[2]	11[2]	1.8	61.1	58.4	(2.7)
East Boston Yacht Club	12	1.2	68.1	66.4	(1.7)
East Boston High School	13	1.9	61.8	63.0	1.2
East Boston – Jeffries Point Yacht Club	14	1.2	61.1	56.5	(4.6)
East Boston – Piers Park	30	1.5	57.2	53.9	(3.3)
Chelsea – Admiral's Hill	15	2.8	62.6	62.4	(0.2)
Revere – Bradstreet and Sales	16	2.4	66.8	68.5	1.7
Revere – Carey Circle	17	5.3	60.5	NA	0.0
Nahant – U.S.C.G. Recreational Facility	18	5.9	60.5	42.1	(18.4)
Everett – Tremont near Prescott	21	4.5	55.0	52.0	(3.0)
Medford – Magoun near Thatcher	22	6.0	52.0	50.0	(2.0)
Swampscott – Smith Lane	19	8.7	48.4	44.4	(4.0)
Lynn – Pond and Towns Court	20	8.4	55.7	51.7	(4.0)
South End – Andrews Street	1	3.7	59.0	53.9	(5.1)
South Boston – B and Bolton	2	2.9	60.1	56.5	(3.6)
South Boston – Day Blvd. near Farragut	3	2.5	63.1	60.8	(2.3)
Roxbury – Boston Latin Academy	27	5.3	57.9	52.0	(5.9)
Jamaica Plain - Southbourne Road	28	7.7	54.0	45.2	(8.8)
Mattapan – Lewenburg School	29	7.3	55.4	43.4	(12.0)
Dorchester – Myrtlebank near Hilltop	23	6.3	58.0	54.2	(3.8)
Milton – Cunningham Park near Fullers	24	8.1	53.2	49.2	(4.0)
Quincy – Squaw Rock Park	25	4.2	52.1	41.3	(10.8)
Hull – Hull High School near Channel Street	26	6.0	59.7	57.2	(2.5)

Note: 2006 measured values are for the first ten months of 2006.
NA Not available

Table 6-9 compares the measured 2007 DNL values at each measurement site to the modeled 2007 DNL value. The differences between the Measured and Modeled are presented and compared to the measured versus modeled differences from 2006. Due to the use of RealContours™, Massport is able to compute the modeled

DNL for the actual periods that the noise monitoring system was collecting data at each site. Only Site 17 was down and did not collect data for a large part of 2007.

Approximately half of the sites experienced improvements between the measured and modeled values. The magnitude of differences between measured versus modeled were reduced in 2007. The three sites in South Boston all match very well (within 1.0dB) Consistent with the changes in the contour, the modeled values for Site 13 increased from 62.3 dB in 2006 to 64.9 dB in 2007.

Table 6-9 Comparison of Measured DNL Values to RealContours-modeled DNL Values

Location	Site	Distance from Logan Airport (miles)	2007 Measured Aircraft – Only DNL	2007 Modeled RC Results INMv7.0(DNL)[1]	2006 Difference - Measured vs. Modeled	2007 Difference - Measured vs. Modeled
Winthrop – Bayview and Grandview	4	1.6	73.1	73.5	3.0	0.4
Winthrop – Harborview and Faun Bar	5	1.9	64.8	65.7	0.8	0.9
Winthrop – Somerset near Johnson	6	0.8	65.4	63.2	(1.7)	(2.2)
Winthrop – Loring Road near Court	7	1.0	68.9	66.9	(0.7)	(2.0)
Winthrop – Morton and Amelia	8	1.6	61.2	62.0	1.0	0.8
East Boston – Bayswater near Annavoy	9	1.3	69.8	70.9	1.2	1.1
East Boston – Bayswater near Shawsheen	10	1.3	64.4	63.3	(1.1)	(1.1)
East Boston – Selma and Orient[2]	11[2]	1.8	58.4	58.2	(3.0)	(0.2)
East Boston Yacht Club	12	1.2	66.4	67.3	3.1	0.9
East Boston High School	13	1.9	63.0	64.0	0.5	1.0
East Boston – Jeffries Point Yacht Club	14	1.2	56.5	56.5	(0.6)	0.0
East Boston – Piers Park	30	1.5	53.9	54.3	0.6	0.4
Chelsea – Admiral's Hill	15	2.8	62.4	61.8	(2.7)	(0.6)
Revere – Bradstreet and Sales	16	2.4	68.5	67.0	2.3	(1.5)
Revere – Carey Circle	17	5.3	NA	59.3	(1.4)	NA
Nahant – U.S.C.G. Recreational Facility	18	5.9	42.1	46.6	(13.6)	4.5
Everett – Tremont near Prescott	21	4.5	52.0	53.3	(2.5)	1.3
Medford – Magoun near Thatcher	22	6.0	50.0	52.4	(2.5)	2.4
Swampscott – Smith Lane	19	8.7	44.4	47.6	(0.8)	3.2
Lynn – Pond and Towns Court	20	8.4	51.7	52.2	(5.3)	0.5
South End – Andrews Street	1	3.7	53.9	54.2	(1.8)	0.3
South Boston – B and Bolton	2	2.9	56.5	57.1	0.6	0.6
South Boston – Day Blvd. near Farragut	3	2.5	60.8	60.5	1.7	(0.3)
Roxbury – Boston Latin Academy	27	5.3	52.0	52.3	(3.2)	0.3
Jamaica Plain - Southbourne Road	28	7.7	45.2	48.7	(2.9)	3.5
Mattapan – Lewenburg School	29	7.3	43.4	46.9	(7.3)	3.5
Dorchester – Myrtlebank near Hilltop	23	6.3	54.2	54.6	(2.8)	0.4
Milton – Cunningham Park near Fullers	24	8.1	49.2	53.1	(0.5)	3.9
Quincy – Squaw Rock Park	25	4.2	41.3	47.8	(2.8)	6.5
Hull – Hull High School near Channel Street	26	6.0	57.2	56.6	(2.2)	(0.6)

Note: 2006 Modeled results were computed to match the same number of months for which the monitor was operational.
1 INMv7.0 with adjusted database. (Database modifications as described in the *Logan Airport 1994/1995 Generic Environmental Impact Report).*
2 Includes FAA-approved terrain adjustment modifying normal INMv7.0 result for Site 11.
NA Not available.

Supplemental Metrics

To better describe the noise environment, the EDR includes supplemental noise metrics: cumulative noise index, dwell and persistence and times above a noise threshold.

Cumulative Noise Index (CNI)

Massport reports total annual fleet noise at Logan Airport, defined in the Logan Airport Noise Rules by a metric referred to as the CNI. The CNI is a single number representing the sum of the entire set of single-event noise levels experienced at the Airport over a full year of operation, weighted similarly to DNL so that activity occurring at night is penalized by adding an extra 10 dB to each event. This penalty is mathematically equivalent to multiplying the number of nighttime events by each aircraft by a factor of 10.

The Logan Airport Noise Rules define CNI in terms of EPNdB and require that the index be computed for the fleet of commercial aircraft operating at Logan Airport throughout the year. In addition, in EDRs and ESPRs, Massport reports partial CNI values of noise at Logan Airport, so that various subsets of the fleet (cargo, night operations, passenger jets, etc.) are identified.

The Noise Rules, adopted by Massport following public hearings held in February 1986, established a CNI limit of 156.5 EPNdB. The CNI generally has decreased since 1990, remaining below that cap, and with typical changes from one year to the next have been on the order of a few tenths of a dB. The 2007 CNI of 152.7 EPNdB represents a 0.1 dB increase from 2006. The CNI increased slightly compared to 2006 primarily because of a small increase in nighttime operations. The 2007 CNI remains well below the cap of 156.5 EPNdB.

Partial CNI Calculations
Partial CNI values were obtained by summing the noise energy from particular segments of Logan Airport's total operations. They are useful for identifying the greatest contributors to overall noise. These results are shown in Table 6-10. The sectors of the fleet with the highest numbers of partial CNI indicate a greater contribution to total noise.

Table 6-10 also indicates that:

- Passenger jets contributed approximately 5.1 dB more noise to the total exposure in 2007 than cargo aircraft.
- Nighttime operations continued to contribute more noise than daytime activity and nighttime flights by air carriers contributed more noise than nighttime cargo operations.
- Consistent with operations, overall nighttime CNI was up slightly in 2007 compared to 2006.
- Daytime operations decreased along with the partial CNI for daytime operations.
- Cargo noise has continued to slightly decrease each year as the major carriers improve their fleet.

Table 6-10 Cumulative Noise Index (EPNdB)[1]

	Logan Airport CNI Cap – 156.5 EPNdB				
	2004	2005	2006	2007	Change from 2006
Full CNI (Entire Commercial Jet Fleet)	153.4	153.2	152.6	152.7	0.1
Total Passenger Jets	152.2	152.1	151.4	151.5	0.1
Total Cargo Jets	147.0	146.6	146.5	146.4	(0.1)
Total Daytime	148.5	148.2	147.5	147.2	(0.3)
Total Nighttime	151.7	151.6	151.0	151.2	0.2
Total Stage 2 Jets	118.1	NA	NA	NA	NA
Total Stage 3 Jets	153.4	153.2	152.6	152.7	0.1
Daytime Stage 2	109.4	NA	NA	NA	NA
Nighttime Stage 2	117.5	NA	NA	NA	NA
Daytime Stage 3	148.5	148.2	147.5	147.2	(0.3)
Nighttime Stage 3	151.7	151.6	151.0	151.2	0.2
Passenger Jet Stage 2	NA	NA	NA	NA	NA
Passenger Jet Stage 3	152.2	152.1	151.4	151.5	0.1
Cargo Jet Stage 2	118.1	NA	NA	NA	NA
Cargo Jet Stage 3	147.0	146.6	146.5	146.4	(0.1)
Daytime Passenger	148.2	147.9	147.2	146.9	(0.3)
Nighttime Passenger	150.0	150.1	149.3	149.7	0.4
Daytime Cargo	135.7	135.8	135.5	135.8	0.3
Nighttime Cargo	146.7	146.2	146.1	146.0	(0.1)
Daytime Passenger Stage 2	NA	NA	NA	NA	NA
Daytime Passenger Stage 3	148.2	147.9	147.2	146.9	(0.3)
Nighttime Passenger Stage 2	NA	NA	NA	NA	NA
Nighttime Passenger Stage 3	150.0	150.1	149.3	149.7	0.4
Daytime Cargo Stage 2	109.4	NA	NA	NA	NA
Daytime Cargo Stage 3	135.7	135.8	135.5	135.8	0.3
Nighttime Cargo Stage 2	117.5	NA	NA	NA	NA
Nighttime Cargo Stage 3	146.7	146.2	146.1	146.0	(0.1)

Note: General aviation and non-jet aircraft are not included in the calculation.
1 Data for years prior to 2004 is available in *Appendix H, Noise Abatement*.
NA No operations by this aircraft type in the commercial fleet.

Dwell and Persistence Goals

Another measure of noise impact relates to the length of time noise impacts occur. In order to provide temporary relief to neighborhoods affected by regular overflights during single or multi-day periods, the PRAS Advisory Committee established two short–term goals for the system in addition to the annual goals:

- Provide relief from excessive dwell. Exceedance would be defined as more than seven hours of operations over a given area during any day between the hours of 7:00 AM and midnight.
- Provide relief from excessive persistence. Exceedance would be defined as more than 23 hours of operations over an area between 7:00 AM and midnight during a period of three consecutive days.

In contrast to the annual goals that count the number of equivalent operations on a runway, dwell and persistence are measured by the number of hours that a given location or area is subject to jet aircraft overflights. The PRAS Advisory Committee designated eight runway combinations for computing the effects of dwell and persistence on the communities. Table 6-11 shows the dwell and persistence areas by community.

This *2007 EDR* reports on dwell and persistence as required as part of Massport's commitments to the Logan Airside Improvements Planning Project.[8] Higher levels of dwell or persistence for overwater areas represent a benefit since this produces a corresponding decrease in total hours over populated areas.

Table 6-11 Representative Neighborhoods Affected by Runway Use

Runway	Representative Affected Neighborhoods
4L and R Arrivals	South Boston (Farragut St.), Dorchester, Quincy, Milton, Weymouth, and Braintree
32 and 33L Arrivals	Boston Harbor, Hull, Cohasset, Hingham, Scituate, and Norwell
14 and 15 Departures	Boston Harbor, Hull, Cohasset, Hingham, and Scituate
22L and R Departures	South Boston (Farragut Street), and Boston Harbor
27 Departures	South Boston (Fan Pier), Roxbury, Jamaica Plain, South End, West Roxbury, Roslindale, Brookline, and Hyde Park
4 L& R departures Plus 22Land R Arrivals	East Boston (Bayswater, Orient Heights), Winthrop (Court Road), Revere, and Nahant
9 Departures Plus 27 Arrivals	Winthrop (Point Shirley), and Boston Harbor
33 Departures Plus 15 Arrivals	East Boston (Eagle Hill), Chelsea, Everett, Medford, Somerville, Arlington, and Cambridge

Figures 6-17 and 6-18 illustrate the annual hours of dwell and persistence by runway end for 2004 through 2007. In 2007, the major contributor to dwell and persistence was in the main north-south flow with arrivals to Runways 22 and 27 and departures from Runways 4 and 9. There was a small increase in both the dwell and persistence in the main East-West flow for arrivals to Runway 15 and departures from Runway 33L, which is attributed to the high prevalence of northwest winds and the added flexibility in runway assignments through the use of Runway 14-32. This increase (arrivals to Runway 15 and departures from Runway 33L) was only a small contribution to the overall dwell and persistence during 2007.

8 *Logan Airside Improvements Planning Project Final EIS*, Section 4.2.3 PRAS Monitoring and Reporting June 2002.

Figure 6-17 Comparison of Annual Hours of Dwell Exceedance by Runway End for 2004 to 2007

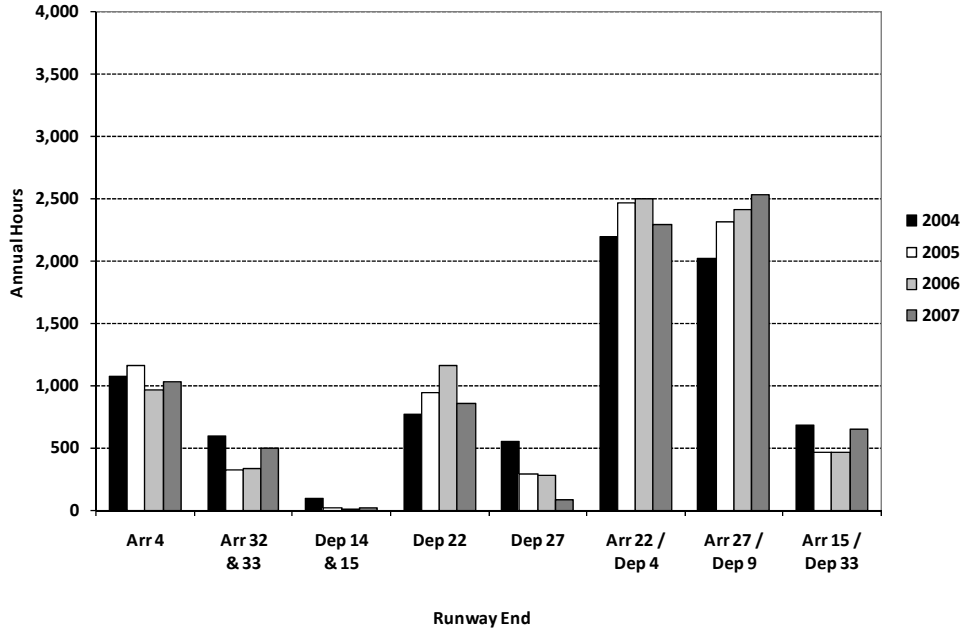
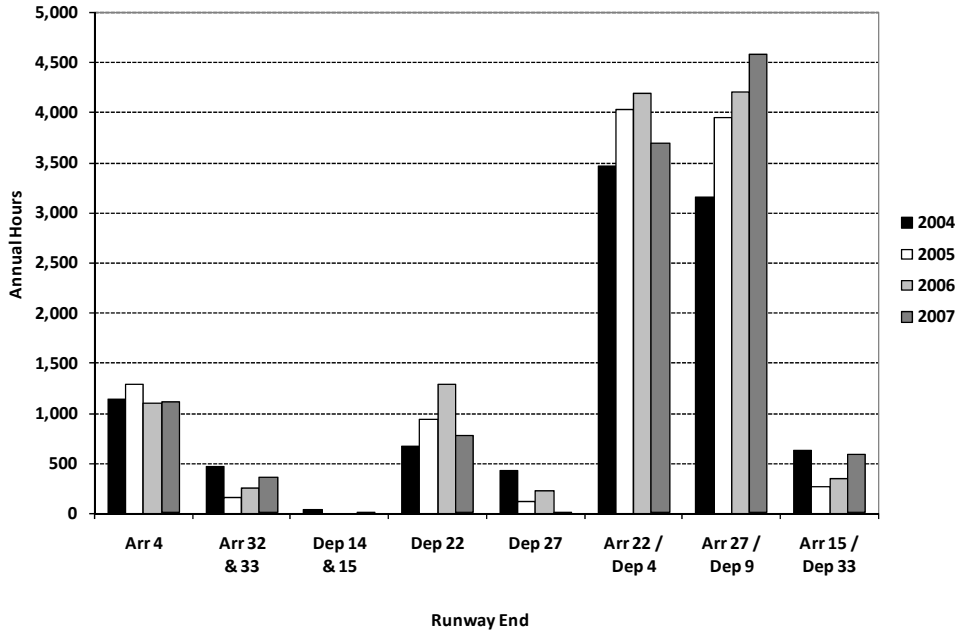


Figure 6-18 Comparison of Annual Hours of Persistence Exceedance by Runway End for 2004 to 2007



Time Above

The third supplemental noise metric reported in this 2007 EDR is the amount of time that aircraft noise is higher than each of three predefined threshold sound levels. The measure is referred to generally as time above (TA), and the threshold sound levels used in the analysis are 65, 75, and 85 dBA (A-weighted decibels). Like DNL values, these times are computed using the FAA-approved INM as modified for Logan Airport. The calculations are made at each of Massport's permanent noise monitoring locations and are based on an average 24-hour day during the year as well as for the average 9-hour nighttime period from 10:00 PM to 7:00 AM. The threshold sound levels of 65, 75, and 85 dBA reflect different degrees of speech interference depending on factors such as whether people are outdoors, indoors with their windows open, or indoors with windows closed. Table 6-12 presents a summary of the calculated TA values for 2007.

Table 6-12 Time Above dBA Thresholds for Average Day, 2007[1]

Location	Site	Distance from Logan Airport (miles)	Minutes above Threshold in a 24-Hour Period			Minutes above Threshold During Nighttime			Modeled Day-Night Sound Levels[2]
			85dBA	75dBA	65dBA	85dBA	75dBA	65dBA	
Winthrop – Bayview and Grandview	4	1.6	9.8	48.0	108.6	1.1	4.7	11.3	73.5
Winthrop – Harborview and Faun Bar	5	1.9	1.0	16.2	85.6	0.1	1.8	8.8	65.7
Winthrop – Somerset near Johnson	6	0.8	0.0	2.2	71.6	0.0	0.7	12.0	63.2
Winthrop – Loring Road near Court	7	1.0	1.0	17.5	120.7	0.1	3.0	18.4	66.9
Winthrop – Morton and Amelia	8	1.6	0.4	3.9	43.1	0.0	0.5	7.9	62.0
East Boston – Bayswater near Annavoy	9	1.3	2.7	21.2	64.4	0.6	4.1	12.1	70.9
East Boston – Bayswater near Shawsheen	10	1.3	0.6	5.0	34.6	0.0	0.7	7.3	63.3
East Boston – Selma and Orient	11	1.8	0.0	1.6	20.3	0.0	0.1	3.6	58.2
East Boston Yacht Club	12	1.2	0.5	29.1	152.3	0.2	5.4	22.2	67.3
East Boston High School	13	1.9	0.9	8.7	36.3	0.1	1.0	3.9	64.0
East Boston – Jeffries Point Yacht Club	14	1.2	0.0	0.4	13.0	0.0	0.0	2.4	56.5
East Boston – Piers Park	30	1.5	0.0	0.2	6.9	0.0	0.0	1.2	54.3
Chelsea – Admiral's Hill	15	2.8	0.5	5.8	31.0	0.1	0.6	3.2	61.8
Revere – Bradstreet and Sales	16	2.4	1.5	12.5	34.4	0.3	2.9	7.6	67.0
Revere – Carey Circle	17	5.3	0.0	2.3	21.6	0.0	0.4	5.0	59.3
Nahant – U.S.C.G. Recreational Facility	18	5.9	0.0	0.0	1.5	0.0	0.0	0.1	46.6
Everett – Tremont near Prescott	21	4.5	0.0	0.4	9.6	0.0	0.1	1.0	53.3
Medford – Magoun near Thatcher	22	6.0	0.0	0.5	7.3	0.0	0.1	0.8	52.4
Swampscott – Smith Lane	19	8.7	0.0	0.1	2.4	0.0	0.0	0.2	47.6
Lynn - Pond and Towns Court	20	8.4	0.0	0.1	3.6	0.0	0.0	1.3	52.2
South End – Andrews Street	1	3.7	0.0	0.6	6.8	0.0	0.1	1.4	54.2
South Boston – B and Bolton	2	2.9	0.0	1.3	11.4	0.0	0.3	2.0	57.1
South Boston – Day Blvd. near Farragut	3	2.5	0.1	4.9	44.5	0.0	0.4	5.0	60.5
Roxbury – Boston Latin Academy	27	5.3	0.0	0.3	5.5	0.0	0.1	1.1	52.3
Jamaica Plain - Southbourne Road	28	7.7	0.0	0.1	2.0	0.0	0.0	0.4	48.7
Mattapan – Lewenburg School	29	7.3	0.0	0.0	1.0	0.0	0.0	0.1	46.9
Dorchester – Myrtlebank near Hilltop	23	6.3	0.0	0.1	11.6	0.0	0.0	1.6	54.6
Milton – Cunningham Park near Fullers	24	8.1	0.0	0.1	6.8	0.0	0.0	1.0	53.1
Quincy – Squaw Rock Park	25	4.2	0.0	0.0	1.1	0.0	0.0	0.1	47.8
Hull – Hull High School near Channel Street	26	6.0	0.0	0.4	12.5	0.0	0.1	3.5	56.6

Notes: Distance from Logan Airport calculated from the Airport Reference Point.
1 INMv7.0 for all of 2007 (12 months) with adjusted database. (Database modifications as described in the *Logan Airport 1994/1995 GEIR).*
2 Modeled using RealContours™ and RealProfiles™ using INM v7.0.

The TA results at many of the sites correspond to the change in the contour levels. At Site 4, which is affected by Runway 9 departures and Runway 27 arrivals (utilization for arrivals increased and departures decreased in 2007), the TA65 level decreased from 125.9 minutes in 2006 to 107.5 minutes in 2007, the TA75 (from 55.6 in 2006 to 48.4 in 2007) and TA85 (from 17.8 in 2006 to 10.5 in 2007) both decreased also. Site 12, which is affected by Runway 22R and 15R departures, experienced a decrease in the TA65 and TA75 levels. The TA65 decreased from 229.0 minutes in 2006 to 90.3 minutes in 2007 and the TA75 decreased from 44.8 minutes in 2006 to 7 minutes in 2007. These changes match the modeled decrease from 70.5 dB to 66.9 dB.

Site 13 at the East Boston High School, the TA65 increased from 19.7 to 36.1 minutes, which matches the modeled increase from 62.4 dB DNL in 2006 to 64.9 dB DNL in 2007.

Noise Abatement

As noise at Logan Airport has decreased in recent years, Massport's emphasis on noise abatement has focused on the benefits of better analysis tools and improved modeling techniques for the purpose of identifying remaining causes of noise problems. In 2004, Logan Airport experienced an increase in annual operations for the first time since the drop-off that occurred following September 11, 2001. In 2005, the increase continued with operations 17 percent below 2000 operations, compared to 18 percent in 2004. In 2006, operations declined slightly but still remained above 2004 levels. During a period of recovering activity at Logan Airport, Massport's noise abatement program has played a critical role in helping to monitor noise impacts.

During 2004, Massport issued a request for proposal (RFP), received submittals, and selected the ERA Corporation (formerly Rannoch) to provide a new noise and operations monitoring system. The majority of the installation has been completed and acceptance of the new system is expected in 2008. Unlike the current stand-alone system, the new system will be incorporated directly into Massport's computer network. Other significant benefits of the new system will include vastly improved analysis and mapping capabilities, use of multi-lateration radar (a separate and unique source of operational data), and direct correlation of noise events with radar flight paths and complaints (a feature that the present system does not have). This latter capability should further improve the ability of the system to differentiate between aircraft and community noise sources.

The new noise and operations monitoring system will be capable of obtaining the same or better quality flight tracking data as is available with the current radar. In 2004, Massport evaluated radar data provided both by FAA STARS and by Megadata's PASSUR system and found the PASSUR data to be more consistent with its current requirements. The PASSUR data is used in the current monitoring system and has been used since the *2004 ESPR*.

Other continuing elements of Massport's noise mitigation program include:

- One of the most extensive residential and school sound insulation programs in the nation. To date, Massport has installed sound insulation in 4,951 residences, including 10,461 dwelling units, and 36 schools in East Boston, Roxbury, Dorchester, Winthrop, Revere, Chelsea, and South Boston.
- To initiate the process with each new grant, Massport's Project Manager for the Residential Sound Insulation Program (RSIP) mails applications to a set of eligible homeowners and often follows up with

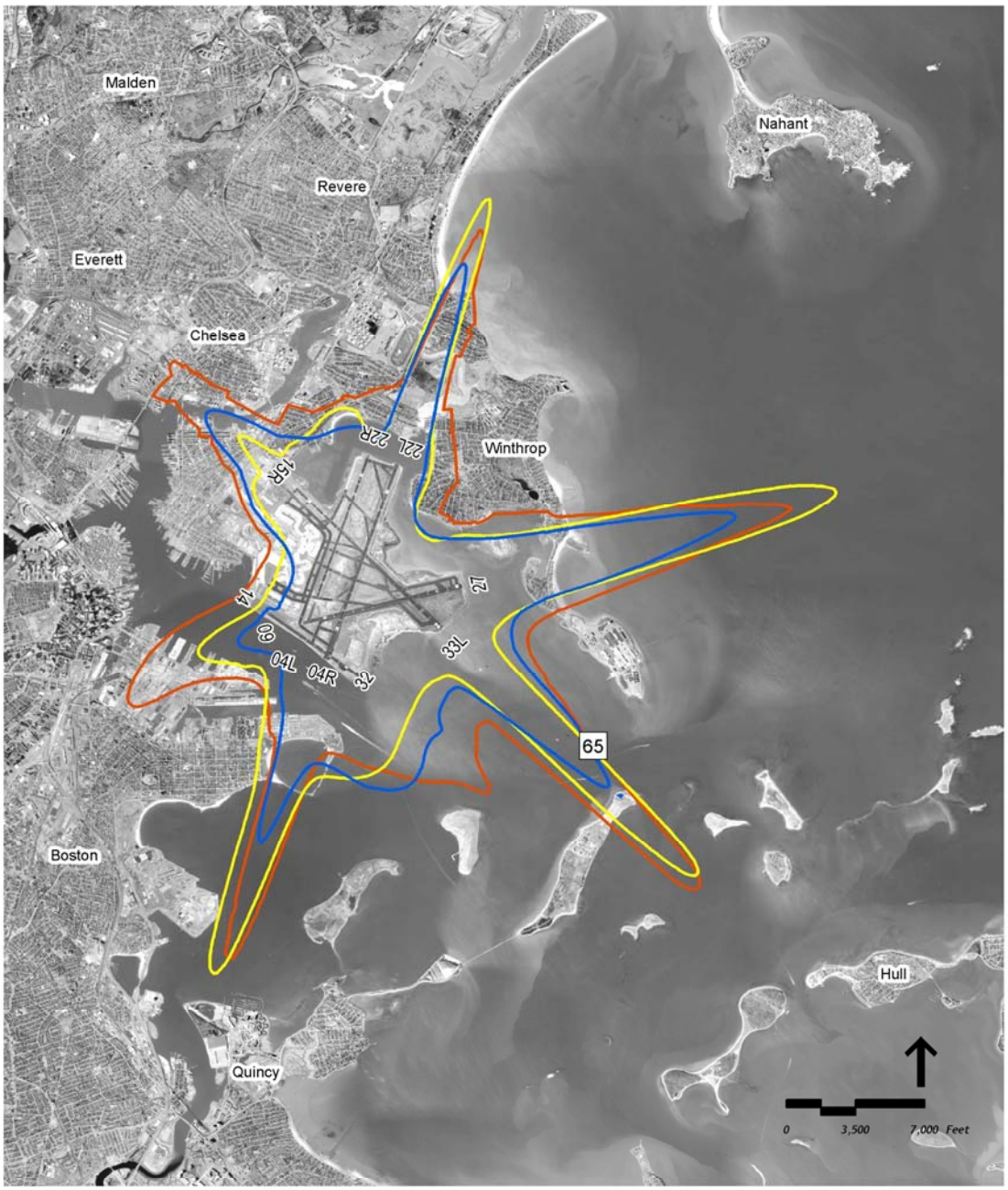
phone calls to encourage participation. Historically, the percentage of eligible homeowners who respond and whose dwellings are ultimately treated varies significantly by community from a high of nearly 90 percent in Revere to a low of about 50 percent in South Boston. Eighty to 85 percent of homeowners in East Boston and Winthrop typically participate. Approximately 8 percent of applicants also choose the Room-of-Preference option that allows the owner to identify a room (usually a bedroom or living room) for extra acoustical treatment.

- Figure 6-19 presents the 65 dB DNL contours for 2006 and 2007. To provide context, the graphic also captures the 65 dB DNL Logan Airside Improvements Planning Project EIS Mitigation Contour. The mitigation contour is adjusted to reflect land use patterns and is the basis for the current sound insulation program currently underway.
- Noise rules restricting nighttime operations of all Stage 2 aircraft between 11:00 PM and 7:00 AM.
- Flight tracks designed to optimize over-water operations (especially during nighttime hours).
- Replacement of Noise Monitoring System Software to improve analysis and reporting capabilities and to provide a back-up capability in case the normal FAA radar data stream is interrupted.
- Continued use of a website that features an internet flight tracking system known as Airport Monitor (www.massport.com/logan). The site provides the general public the opportunity to track individual flights to and from Logan Airport; it also provides substantive information on Massport's sound insulation program, the Airport's noise monitoring system, various abatement measures, and other information of interest to the public.
- On-line logging of noise complaints.
- Summary reports of operations by airline, runway, aircraft type, and other parameters that help the Noise Office track potential changes in the noise environment. Tables 6-13 and 6-14 provide examples of these reports.

Table 6-13 summarizes how commercial air carrier and cargo operators are deploying the newest engine technology at Logan Airport. The table presents the listing of each airline operator and the percentage of its fleet that is full Stage 3 compliant. Of the major cargo operators, UPS improved its percentage of Stage 3 operations to 100 percent, FedEx increased slightly from 70 to 71 percent, and DHL remained at 1 percent with its fleet of older Boeing 727 aircraft. Most of the charter operators remained similar to 2006 or increased their percentage of Stage 3 operations. Only one major U.S. Airline, Northwest Airlines, does not have a 100 percent Stage 3 fleet operating at Logan Airport. Northwest Airlines is in the process of phasing out its fleet of DC-9 aircraft, and improved its Stage 3 level to 96 percent in 2007 from 94 percent in 2006. Delta Air Lines increased its percentage of Stage 3 operations from 98 percent to 100 percent with the retirement of 737-200 aircraft from its fleet.

Table 6-14 provides the number of flight operations, the resulting partial CNI by airline for 2007 and the partial CNI by operation for 2006 and 2007. The table shows the relative contribution of each airline to total CNI and reflects the contributions of individual aircraft noise levels and the frequency with which they occur.

Figure 6-19 Comparison of the 65 dB DNL Contour for 2006 and 2007 Operations and 65 dB DNL Logan Airside Improvements Planning Project EIS Mitigation Contour



2007 dB DNL Contour (INMv7.0)
2006 dB DNL Contour (INMv6.2a)
Airside Sound Insulation Mitigation Contour [1]

1 Humanized ALTIA with NWSE Wind Restriction Contour

Table 6-13 Percentage of Airline Operations in Full Stage 3 Aircraft During 2007

Airlines with more than 100 flights	Number of Flights 2007	Percentage of Full Stage 3 Operations[1] 2004	2005	2006	2007	100% Full Stage 3[2]
Aer Lingus	1,221	100%	100%	100%	100%	✓
Aeromexico	131	100%	100%	100%	100%	✓
Air Canada	3,377	100%	100%	100%	100%	✓
Air France	957	100%	100%	100%	100%	✓
Airtran Airways	18,685	100%	100%	100%	100%	✓
Alaska Airlines	1,423	100%	100%	100%	100%	✓
Alitalia	886	100%	100%	100%	100%	✓
America West	2,874	100%	100%	100%	100%	✓
American Airlines	28,289	100%	100%	100%	100%	✓
American Eagle Airlines	26,950	100%	100%	100%	100%	✓
British Airways	2,160	100%	100%	100%	100%	✓
Capital Cargo International	411	0%[3]	0%[3]	0%[3]	7%	
Chatauqua	5,788	100%	100%	100%	100%	✓
Continental	14,090	100%	100%	100%	100%	✓
Delta Air Lines	22,628	100%	97%	98%	100%	✓
DHL Airways	995	0%[3]	20%	1%[4]	1%	
Federal Express	4,609	70%	72%	70%	71%	
Icelandair	869	100%	100%	100%	100%	✓
Iberia Air Lines of Spain	304	NA	NA	100%	100%	✓
Jazz by Air Canada/ Air Nova	8,006	100%	100%	100%	100%	✓
JetBlue Airways	36,296	100%	100%	100%	100%	✓
Delta Connection/Atlantic SE	182	100%	100%	100%	100%	✓
Delta Connection/Comair	29,391	100%	100%	100%	100%	✓
Flyglobespan	225	100%	100%	100%	100%	✓
Delta Connection/Delta Shuttle	9,114	100%	100%	100%	100%	✓
Kittyhawk	429	5%	1%	30%	36%	
Lufthansa	1,515	100%	100%	100%	100%	✓
Miami Air Int'l	326	78%	98%	91%	100%	✓
Midwest Express	4,672	99%	100%	100%	100%	✓
North American	193	100%	100%	100%	100%	✓
Northwest	9,449	87%	87%	94%	96%	
Pinnacle Airlines	3,547	NA	NA	100%	100%	✓
SATA International Airlines	393	100%	100%	100%	100%	✓
Shuttle America Corp.	648	NA	0%[3]	0%[3]	100%[5]	✓
Spirit Airlines	1,796	NA	NA	100%	100%	✓
Swiss International Airlines	727	100%	100%	100%	100%	✓
TACA	165	100%	100%	100%	100%	✓
US Airways Express/PSA (Penn)	109	100%	NA	100%	100%	✓
US Airways Express/Republic	731	100%	100%	100%	100%	✓
United Airlines	20,140	100%	100%	100%	100%	✓
United Express/AWAC	7,289	NA	100%	100%	100%	✓
United Express/Mesa	2,348	NA	0%[3]	100%	100%	✓
United Parcel Service	1,348	94%	94%	98%	100%	✓
US Airways	38,529	100%	100%	100%	100%	✓
Virgin Atlantic	732	100%	100%	100%	100%	✓
Xtra Airways	126	NA	100%	100%	100%	✓

Source: Massport.
Notes: Airlines operate the balance of their operations in recertificated Stage 3 aircraft.
NA Airline had no operations at Logan Airport.
1 Operations for some carriers differ with those in *Chapter 2, Activity Levels* and *Chapter 7, Air Quality/Emissions Reduction* because the table only includes jet aircraft, not turboprops, and it includes scheduled and unscheduled air carriers.
2 New Stage 3 means originally manufactured as a certified Stage 3 aircraft under FAR Part 36.
3 No aircraft used at the Airport were full Stage 3 aircraft.
4 In 2006, DHL Airways took over Airborne which had no full Stage 3 aircraft.
5 In 2007, Shuttle America Corp. began operating for Delta Connection.

Table 6-14 Annual Operations and Partial CNI by Airline During 2007

Airlines with more than 100 flights in 2007	2007 Operations[1]	2007 Total Airline CNI	Partial CNI per Operation 2006	Partial CNI per Operation 2007	Airline Category
DHL Airways	995	137.99	107.75	108.01	Cargo
Federal Express	4,609	144.4	107.85	107.76	Cargo
United Parcel Service	1,348	138.13	106.74	106.84	Cargo
Air France	957	136.13	98.03	106.32	International
Capital Cargo International	411	130.74	103.25	104.61	Cargo
Lufthansa	1,515	135.6	99.42	103.79	International
Kitty Hawk	429	129.04	103.44	102.72	Cargo
Miami Air	326	127.33	NA	102.2	International
Alaska Airlines	1,423	133.48	100.54	101.95	Domestic
British Airways	2,160	134.88	103.14	101.54	International
SATA International Airlines	393	127.09	101.01	101.14	International
United Airlines	20,140	143.05	99.93	100.01	Domestic
America West Airlines	2,874	135.11	99.54	99.81	Domestic
TACA	165	121.8	102.1	99.62	International
Continental	14,090	140.98	101.28	99.49	Domestic
XTRA (Casino Express)	126	120.09	NA	99.09	International
Virgin Atlantic	732	127.28	102.5	98.63	International
Northwest	9,449	138.16	98.21	98.41	Domestic
North American	193	120.95	97.92	98.1	Charter
Delta Air Lines	22,628	140.88	97.82	97.33	Domestic
Delta Connection/Delta Shuttle	9,114	136.93	NA	97.33	Domestic
Swiss Air	727	125.71	96.64	97.09	International
American Airlines	28,289	141.6	96.78	97.08	Domestic
Aeromexico	131	118.05	99.09	96.88	International
Aer Lingus	1,221	127.74	96.86	96.87	International
JetBlue Airways	36,296	142.04	96.82	96.44	Domestic
Alitalia	886	125.75	96.25	96.28	International
US Airways	38,529	141.98	96.19	96.13	Domestic
Iberia Air Lines of Spain	304	120.93	NA	96.1	International
Flyglobespan	225	118.99	NA	95.47	International
Icelandair	869	122.74	94.45	93.35	International
Midwest Express	4,672	129.98	93.02	93.29	Regional
Mesa Airlines	2,348	126.79	92.24	93.09	Regional
AirTran Airways	18,685	135.76	92.94	93.04	Domestic
Pinnacle Airlines	3,547	128.53	NA	93.03	Regional
American Eagle Airlines	26,950	135.82	92.4	91.52	Regional
Delta Connection/Comair	29,391	136.2	NA	91.52	Domestic
United Express/AWAC	7289	129.69	89.7	91.07	Regional
US Airways Express	8,129	129.8	NA	90.7	Regional
Air Canada Jazz	8,006	129.72	91.07	90.69	Regional
Delta Connection/Atlantic SE	182	112.08	NA	89.48	Domestic
Chautauqua	5788	126.83	91.19	89.2	Regional
US Airways Express/PSA (Penn)	109	109.56	NA	89.19	Regional
Shuttle America Corp	648	114.49	NA	86.38	Regional
Air Canada	3,377	120.58	95.25	85.29	International
US Airways Express/Republic	731	111.48	NA	82.84	Regional

Source: Massport.

1 Operations for some carriers differ to those in *Chapter 2, Activity Levels* and *Chapter 7, Air Quality/Emissions Reduction* because this table only includes jet aircraft and not turboprops, and because it includes both scheduled and unscheduled air carriers.

NA Airline had no operations at Logan Airport.

Regional carriers are near the bottom of the list (Table 6-14) contributing the least partial CNI whereas cargo operators, which operate older louder aircraft, often at night, are near the top of the list. DHL which has only 1 percent of its fleet in Stage 3 aircraft has moved to the top of the list even though they have less than a quarter of the operations that Federal Express has. The relative positions for the domestic carriers are due mainly to their fleet and percent of night operations. United Airlines has 17.7 percent of its operations at night as opposed to Airtran which has only 9.0 percent at night. JetBlue Airways also has one of the highest night percentages (15.6 percent) but operates a much newer fleet than American Airlines or United Airlines.

In 2007, Massport received a total of 5,415 noise complaints from 64 communities, an increase of 37 percent from 2006, when the NAO received 3,955 complaints. Table 6-15 is a summary of noise complaints from the Massport NAO. *Appendix H, Noise Abatement* has a full listing of the complaints by community. Among communities with more than 100 annual complaints, the greatest increases were in Cambridge (up from 367 in 2006 to 622 in 2007), Chelsea (up from 260 in 2006 to 902 in 2007), East Boston (up from 75 in 2006 to 235 in 2007), Marshfield (up from 5 in 2006 to 148 in 2007), Somerville (up from 13 in 2006 to 352 in 2007), and Woburn (up from 5 in 2006 to 711 in 2007). While complaints in Woburn increased, it should be noted that all of the complaints in 2007 were from the same four individuals. These increases are not unexpected given the increased use of Runway 33L for departures during 2007, as well as the Marshfield community's increased attention to the Boston Logan Airport Noise Study. Five communities with more than 100 annual complaints experienced a decrease in noise complaints for 2007: Hingham (down from 242 in 2006 to 102 in 2007), Hull (down from 312 in 2006 to 254 in 2007), Jamaica Plain (down from 218 in 2006 to 154 in 2007), Lexington (down from 642 in 2006 to 153 in 2007), and Roxbury (down from 182 in 2006 to 154 in 2007).

Table 6-15 Noise Complaint Line Summary

	2006		2007		Change		2006		2007		Change
Town	Calls	Callers	Calls	Callers	Calls	Town	Calls	Callers	Calls	Callers	Calls
Cambridge	367	12	622	62	255	Hingham	242	14	102	12	(-140)
Chelsea	260	33	902	72	642	Hull	312	29	254	33	(-58)
East Boston	75	36	235	97	160	Jamaica Plain	218	49	154	39	(-64)
Marshfield	2	5	144	50	142	Lexington	642	1	153	1	(-489)
Somerville	13	8	352	162	339	Roxbury	182	18	154	11	(-28)
Woburn	5	2	711	4	706						

Massport's noise abatement goals are achieved through implementation of multiple elements. Table 6-16 lists these goals and the associated plan elements, and reports on progress toward achieving these goals.

Boston Logan Airport Noise Study

The FAA's Record of Decision (ROD) approving construction of the new unidirectional Runway 14-32 requires that the FAA, Massport, and the Community Advisory Committee (CAC) jointly undertake a study to determine whether changes to existing noise abatement flight track corridors might further reduce noise impacts. In addition, the Massachusetts Environmental Policy Act (MEPA) Certificate for the Airside Improvements EIR directed Massport to work with the FAA and local communities on a review of the Logan Airport PRAS.

The noise study is being conducted in multiple phases. Phase 1 of the Study was initiated in the winter of 2004 and was completed in fall of 2007. During Phase 1, 55 airspace and operational alternatives to reduce noise related to Logan Airport overflights were identified and screened for safety, operational, and noise benefits. Of the 55 alternatives, 12 measures were identified as potentially implementable in the near term. The first phase of this was completed in 2007 and a Categorical Exclusion was issued by FAA in October 2007 for several flight path changes mostly along the northeast and southeast shores from the Airport.

Phase 2 includes a more detailed analysis of alternatives (plus other alternatives that may be proposed by the FAA, the community and other interested parties) as well as an assessment of alternatives requiring additional environmental review and including ground noise. Phase 3 will begin the initial work on reevaluating Logan Airport's PRAS, although at this time PRAS is expected to be reevaluated after potential additional measures from Phase 2 are in place. Phase 2 is known as the Boston Logan Airport Noise Study (BLANS) and began in spring of 2007. Additional information is available from the projects website (www.Bostonoverflight.com).

Centerfield Taxiway Project

The centerfield taxiway is included in the list of airfield actions to improve Logan Airport's safety and efficiency and was studied extensively in the Boston-Logan Airside Improvements Planning EIS/Environmental Impact Report (EIR) (1995 to 2002). Massport received state environmental approval from MEPA to proceed with the centerfield taxiway improvement. As part of its ROD for the Airside Project under NEPA, the FAA deferred its decision on centerfield taxiway pending an operational review to identify any other potential beneficial actions. The FAA directed the technical work on the operational review and led the briefings to a citizen panel. The FAA divided the study into two phases. Phase 1 focused on current conditions and Taxiway November, and Phase 2 included operations with both Taxiways November and centerfield taxiway. Both of these Phases were completed and the public comment period on the project ended in September of 2006. FAA issued its ROD for this project on April 20, 2007, which states that the "FAA concludes that the data and analysis contained in the EIS with regard to the environmental impacts of the proposed centerfield taxiway are still adequate, accurate, current and valid, and that FAA has fulfilled its mitigation commitment, as detailed in the 2002 ROD on the Airside Improvements Planning Project, 'to assess potential beneficial operational procedures that would preserve or improve the operational and environmental benefits of the centerfield taxiway as shown in the EIS.'" Construction of the centerfield taxiway began in the spring of 2008.

Table 6-16 Noise Abatement Management Plan

Noise Abatement Goal	Plan Elements	2007 Progress Report
Limit total aircraft noise	Limit on CNI	The CNI value for 2007 was 152.7 EPNdB, significantly below the cap of 156.6 EPNdB.
	Stage 3 percentage Requirement in Noise Rules	In 2007, Stage 3 operations represented 100 percent of Logan Airport's total commercial jet traffic. The few Stage 2 operations that occurred during the year were all older small corporate jets flown by Charters and because these aircraft were less than 75,000 pounds gross takeoff weight, they were in full compliance with FAR Part 91, but still prohibited from operating at Logan Airport during the hours of 11:00 PM to 7:00 AM.
Mitigate noise impacts	Residential Sound Insulation Program	548 dwelling units were sound insulated in 2007, bringing the total of treated dwelling units to 10,461 since the start of the program in 1986. The majority (405) of dwelling units sound insulated in 2007 were in Chelsea. See *Appendix H, Noise Abatement* for additional details.
	School Sound Insulation Program	36 eligible schools have been sound insulated since this program began.
	Noise Abatement Arrival and Departure Procedures	Flight track monitoring and data analysis were used to check adherence to noise abatement flight procedures. See *Appendix H, Noise Abatement* for copies of the 2007 monitoring report.
	PRAS Runway End Use Goals	The PRAS system was last used early in 2004 but disabled when the TRACON switched to the STARS radar and moved to Merrimack, NH. Massport has upgraded the system to handle the new STARS data and it was installed during 2007. FAA and Massport are reviewing the results of the new software and will make further modifications if necessary.
	Runway Restrictions	Noise-based use restrictions 24 hours per day on departures from Runway 4L and arrivals on Runway 22R were continued.
	Reduced-Engine Taxiing	Use of reduced-engine taxiing is encouraged where appropriate and safe.
Improve Noise Monitoring System	Replace Existing Noise Monitors, Install Multi-lateration Antennas for Flight Track Monitoring, and Install New Robust Software	Massport wrote a specification for a state-of-the-art system and contracted with ERA Corporation to install the system in 2005 and work began in 2006. New noise monitors will provide 1/3 octave band data at all sites to aide with aircraft identification. Noise events, flight events, and complaints will all be linked. Multilateration will provide improved radar coverage near the ground to help in identification of aircraft and runway assignment. Acceptance testing will occur in 2008.
Minimize nighttime noise	Nighttime Stage 2 Aircraft Prohibition	Prohibition of Stage 2 aircraft from operations at Logan Airport between 11:00 PM and 7:00 AM was continued.
	Nighttime Runway Restrictions	Prohibitions on use of Runway 4L for departures and Runway 22R for arrivals between 11:00 PM and 6:00 AM were continued.
	Maximization of Late-Night Over-Water Operation	Efforts to maximize late-night over-water operations were continued. Use of Runway 15R for departures and Runway 33L for arrivals was continued.
	Nighttime Engine Run-up and APU Restrictions	Restriction on nighttime engine run-ups and use of auxiliary power units (APUs) was continued.
Address/respond to noise issues and complaints	Noise Complaint Line	Massport continued operation of Noise Complaint Line, (617) 561-3333. In 2007, Massport's NAO responded to 5,415 calls from callers living in 64 communities. NAO issued the 2007 Noise Report (provided in *Appendix H, Noise Abatement)*.
	Special Studies	Massport continued to provide technical assistance and analysis using noise monitoring system to support FAA and others in monitoring jet departure tracks from Runway 27.
		The Boston Logan Airport Noise Study (BLANS) will determine whether changes to existing flight track corridors might reduce noise impacts. Phase 1 is complete and Phase 2 is underway.

7

Air Quality/ Emissions Reduction

Introduction

This chapter describes the air quality conditions at Logan Airport in 2007 and compares them to air quality conditions in 2006. This information is based on an up-to-date emissions inventory of Airport-related volatile organic compounds (VOCs), oxides of nitrogen (NO_x), carbon monoxide (CO), and particulate matter (PM).[1] An inventory of greenhouse gases (GHGs) is included for the first time. This chapter also presents an update of air quality monitoring data for nitrogen dioxide (NO_2) collected by Massport in the vicinity of the Airport. Status reports are provided on Massport's Air Quality Initiative (AQI) (a 15-year voluntary program with the goal of maintaining NO_x emissions at, or below, 1999 levels); the Massport Air Monitoring Study (a program that will gather air quality data in the communities around Logan Airport before and after the centerfield taxiway is operational); and other Massport air quality initiatives.

Key Findings

In 2007:

- The modeled emissions inventory results were driven principally by three factors:
  - The change in the aircraft fleet mix at the Airport generally characterized by the on-going substitution by airlines of select narrow-body aircraft with both wide-body and commuter aircraft.
  - The reported change in the aircraft average taxi/delay times at Logan Airport.
  - Continual improvements to the Federal Aviation Administration (FAA) Emissions and Dispersion Modeling System (EDMS), v5.0.2, particularly in regard to the advanced method for calculating PM emissions from aircraft engines.

1 PM less than or equal to 10 microns (PM_{10}) and PM less than or equal to 2.5 microns ($PM_{2.5}$) are subsets of PM.

- Other contributing factors to the results of the emissions inventory include the availability of Logan Airport-specific fuel type information for ground service equipment (GSE) and the increased demand for indoor heating and outdoor snow-melting operations Airport-wide associated with the unusually severe winter season of 2007. The in-place air quality initiatives at the Airport and other ongoing efforts by Massport to minimize emissions also played a role.
- Because of the changes to the EDMS model, total emissions of $PM_{10}/PM_{2.5}$ associated with Logan Airport appear to have increased by approximately 64 percent to 128 kilograms per day (kg/day) compared to 2006 levels. By comparison, using the EDMS available in 2006 (v5.0.1) total emissions of $PM_{10}/PM_{2.5}$ would have increased by approximately 5 percent to 82 kg/day due to a combination of changes in aircraft fleet mix and aircraft taxi/delay time. This information is included to show that the estimated increase in $PM_{10}/PM_{2.5}$ was due mostly to the updated EDMS model and not the result of significant changes in Airport operations.
- Total emissions of VOC were 1,673 kg/day, or 3 percent lower than 2006 levels.
- Total emissions of CO were 9,233 kg/day, or 13 percent higher than 2006 levels.
- Total emissions of NO_X were 4,457 kg/day, or 7 percent higher than 2006 levels. In 2007, total NO_x emissions at Logan Airport were approximately 541 tons per year (tpy) lower than the 1999 AQI benchmark. This represents a 27 percent decrease in NO_x emissions since 1999.
- "Direct emissions" are those that occur in areas located within the Airport's geographic boundaries and "indirect emissions" are those that occur off the Airport site. "Direct" GHG emissions associated with Logan Airport were 0.37 million metric tons (MMT), and the sum of "direct" and "indirect" emissions was 0.69 MMT, or less than 0.1 percent of state-wide totals. Massport contributes only 18 percent of these combined totals and will implement plans by 2009 to reduce further and offset GHGs associated with its operations at Logan Airport and help minimize the Airport's "carbon footprint" overall.
- There was a continuing trend of decreasing NO_2 concentrations at both the Massport and Massachusetts Department of Environmental Protection (MA DEP) monitoring sites located in the general vicinity of Logan Airport. In addition, the annual NO_2 concentrations at all monitoring locations in 2007 were well within the National Ambient Air Quality Standards (NAAQS) for NO_2.
- The first phase of the two-phase Massport Air Monitoring Study commenced in September. The study will determine the air quality impacts (both on Logan Airport and in neighboring areas) associated with operation of the centerfield taxiway. Massport provides MA DEP and the Massachusetts Department of Public Health (MDPH) with the air quality monitoring results on an ongoing basis.

Regulatory Framework

The federal Clean Air Act (CAA), the NAAQS, and similar state law govern air quality issues in Massachusetts. The NAAQS and the Massachusetts State Implementation Plan (SIP) promulgated pursuant to, and in compliance with the CAA and the 1990 amendments to the CAA regulate air quality issues in this area, and are discussed in the next section.

National Ambient Air Quality Standards

The United States (U.S.) Environmental Protection Agency (EPA) established NAAQS for a group of criteria air pollutants to protect public health, the environment, and the quality of life from the detrimental effects of air

pollution. These NAAQS are set for the following six pollutants: CO, lead (Pb), NO_2, ozone, PM_{10}, $PM_{2.5}$ and sulfur oxides (SO_x). The NAAQS primary standards (designed to protect human health) and secondary standards (designed to protect human welfare) are contained in Table 7-1.

Based on air monitoring data and in accordance with the CAA, all areas within Massachusetts are designated with respect to the NAAQS as *attainment*, *nonattainment*, *maintenance*, or *unclassifiable*.[2] An area with air quality better than the NAAQS is designated as attainment; an area with air quality worse than the NAAQS is designated as nonattainment. An area may be designated as unclassifiable when there is a temporary lack of data to form a basis for determining attainment status. Nonattainment areas are further classified as extreme, severe, serious, moderate, and marginal by the degree of non-compliance with the NAAQS. The current attainment/nonattainment designations for the Boston metropolitan area are summarized in Table 7-2.

Table 7-1 National Ambient Air Quality Standards

Pollutant	Averaging Time	Standard ppm	Standard µg/m³	Notes:
Carbon Monoxide (CO)	1 hour	35	40,000	Not to be exceeded more than once a year.
	8 hour	9	10,000	Not to be exceeded more than once a year.
Lead (Pb)	Quarterly	—	1.5	Not to exceed this level.
Nitrogen Dioxide (NO_2)	Annual	0.053	100	Not to exceed this level.
Ozone	1 hour	0.120	235	Number of exceedances averaged over three years must be less than or equal to 1. Standard was revoked by EPA in June 2005.
	8 hour[1]	0.080	157	The average of the annual 4th highest daily 8-hour maximum over a three-year period is not to exceed this level. Standard was replaced in 2007.
	8 hour[2]	0.075	147	The average of the annual 4th highest daily 8-hour maximum over a three-year period is not to exceed this level. This standard was promulgated in 2007.
Particulate Matter with a diameter $\leq$ 10 µm (PM_{10})	24 hour	—	150	Not to be exceeded more than once a year.
	Annual	—	—	Standard was revoked by EPA in 2006.
Particulate Matter with a diameter $\leq$ 2.5 µm ($PM_{2.5}$)	24 hour	—	35	The three-year average of the 98th percentile for each population-oriented monitor within an area is not to exceed this level.
	Annual	—	15	The three-year average of the annual arithmetic mean from single or multiple monitors within an area is not to exceed this level.
Sulfur Oxides (SO_x)	3 hour	0.50	1,300	Not to be exceeded more than once a year.
	24 hour	0.14	365	Not to be exceeded more than once a year.
	Annual	0.03	80	Not to exceed this level.

Source: EPA, 2008 (www.epa.gov/air/criteria.html).
1 The 1997 NAAQS for ozone.
2 The new 2007 NAAQS for ozone.
ppm Parts per million.
µg/m³ Micrograms per cubic meter.

The entire Boston metropolitan area is designated as in attainment for all the criteria pollutants except ozone, which is designated as "moderate" nonattainment for the 1997 eight hour ozone standard (Table 7-2). The ozone nonattainment area consists of 10 counties in Massachusetts (Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, and Worcester). Logan Airport is located in Suffolk County.

2 US Environmental Protection Agency, *The Green Book Nonattainment Areas for Criteria Pollutants* (www.epa.gov/air/oaqps/greenbk/).

Table 7-2 Attainment/Nonattainment Designations for the Boston Metropolitan Area

Pollutant	Designation
Carbon monoxide (CO)	Attainment
Nitrogen Dioxides (NO_2)	Attainment
Ozone (8-hr) [2]	Nonattainment (Moderate)
Particulate matter (PM_{10})	Attainment
Particulate matter ($PM_{2.5}$)	Attainment
Sulfur Dioxide (SO_2)	Attainment
Lead (Pb)	Attainment

Source: EPA, 2008 (www.epa.gov/air/oaqps/greenbk/).

State Implementation Plan (SIP)

Because the Boston area did not meet the former one-hour NAAQS for ozone, a SIP has been developed to reduce ozone levels to meet the NAAQS for this pollutant. The SIP is the regulatory scheme for bringing nonattainment areas in Massachusetts into compliance with the NAAQS. As stated above, the entire Boston area is designated as "moderate" nonattainment for the 1997 eight-hour ozone standard. By 2010, the MA DEP will be required to submit a new SIP to the EPA for the new 2007 eight-hour ozone standard. The current and future SIPs for the Boston area are summarized in Table 7-3.

Table 7-3 State Implementation Plan for Ozone

Standard	Title	Status	Comments
One-Hour	One hour Ozone Attainment Demonstration for the Massachusetts Portion of the Boston-Lawrence-Worcester, Massachusetts-New Hampshire Ozone Nonattainment Area.	Published December 6, 2002 as final rule.	EPA approved this SIP revision and established an attainment date of November 15, 2007, for the entire multi-state nonattainment area. Focuses on the control of NO_X and VOCs as precursors to ozone. This is the "currently approved" SIP for the Boston area.
Eight-Hour	Final Massachusetts State Implementation Plan To Demonstrate Attainment of the National Ambient Air Quality Standard for Ozone	Submitted to EPA, January 31, 2008 for approval.	This standard calls for the attainment of the 1997 eight-hour NAAQS for ozone by 2010 and focuses on the control of NO_X and VOCs as precursors to ozone. (The EPA call for states to submit SIPs for the new 2007 8-hour NAAQS for ozone is scheduled for 2013.[1, 2])

Source: MA DEP (www.mass.gov/dep/air/priorities/sip.htm).

1 In 2007, the EPA promulgated a new 8-hour NAAQS for ozone. Informally called the "2007 standard" to differentiate it from the former "1997 standard", this new standard is more strict (i.e., lower) than the former standard. Designations of attainment/nonattainment for the 2007 standard will be made by the EPA in 2010. Presently, it is not known which designation will be given to the Boston area but it is very likely to be designated as a "nonattainment" area for the new "2007 standard" for ozone.

2 The SIP established the Logan Airport Parking Freeze and the limit of 17,319 commercial/3,373 employee spaces at the Airport in 2007.

Logan Airport Air Quality Permits for Stationary Sources of Emissions

Massport received a Title V Air Operating Permit for Logan Airport in September 2004. This permit covers all of the Massport-operated stationary sources including the Central Heating and Cooling Plant, snow melters, fuel dispensers, boilers, emergency electrical generators, and fuel storage tanks.

Methodology for Emissions Inventory

The analysis of air emissions associated with Logan Airport operations includes source categories; each of the emissions sources has its own assessment methodology, database, and assumptions as described below.

- **Aircraft Emissions —** The FAA EDMS is the EPA-preferred and the FAA-required program for calculating aircraft emissions. Since the FAA continually improves the performance, precision and adaptability of the EDMS, the program is subject to regular updates and revisions. For this analysis, the most recent version, EDMS v5.0.2, was used to compute the 2007 Logan Airport emissions inventory. Compared to the last version (EDMS v5.0.1) used in the *2006 Environmental Data Report (EDR)*, there are a few changes to the program; the most notable of which is a more advanced method to calculate aircraft engine PM emissions using the EPA-approved "first-order-approximation" (FOA3a) methodology, which now accounts for PM formation from sulfates contained in aircraft engine exhaust.[3]

  As with recent Environmental Status and Planning Reports (ESPRs) and Environmental Data Reports (EDRs), the actual aircraft fleet mix at Logan Airport was used to analyze 2007 conditions. In a few instances where the aircraft/engine type or combinations operating at Logan Airport were not available in the EDMS database and consistent with FAA guidance, substitutions were made based on the closest match of aircraft type and engine performance characteristic. Table I-1 in *Appendix I, Air Quality/Emissions Reduction* contains the data that were used, including aircraft type, engine, landing and takeoff operations (LTOs), and aircraft taxi/delay times. For the analysis, the aircraft are grouped into four categories: commercial air carriers, commuter aircraft, general aviation (GA), and cargo aircraft.

  From 2006 to 2007, total LTOs decreased by approximately 2 percent overall with air carrier LTOs decreasing by approximately 1 percent, air cargo LTOs decreasing by about 4 percent, and GA decreasing by approximately 9 percent. However, the aircraft fleet mix at the Airport also changed and is generally characterized by a trend toward the substitution of select narrow-body aircraft with both wide-body and commuter aircraft by commercial and cargo air carriers.

  Aircraft taxi/delay times are based on data obtained from the FAA Aviation System Performance Metrics (ASPM) database for 2007.[4] From this database, the average aircraft taxi/delay times at Logan Airport reportedly increased from 25.3 minutes to 26.8 minutes from 2006 to 2007, which is an increase of about 6 percent.

- **Ground Service Equipment —** Estimates of GSE emissions for 2007 were based on EDMS emission factors and continue to reflect emission reductions attributable to Massport's Alternative Fuel Vehicle (AFV) Program, and the conversion of Massport and tenant GSE and fleet vehicles to compressed natural gas (CNG) or electricity. Model input data are based on the 2001 AFV Survey conducted by Massport, and an

3 *EDMS 5.02 Release Notes*, Federal Aviation Administration (FAA), June 29, 2007.
4 FAA Aviation System Performance Metrics (ASPM) database for 2007 (www.apo.data.faa.gov).

on-site GSE time-in-mode survey completed in 2004, and new information regarding GSE fuel use (e.g., gasoline, diesel, GNG, etc.) from the *Logan Airport Vehicle Aerodrome Permit Application* process.[5]

- **Motor Vehicles —** Motor vehicle emission factor data were obtained from the most recent version of EPA's MOBILE model (MOBILE6.2.03) combined with MA DEP recommended motor vehicle fleet mix data, operating conditions, and other Massachusetts-specific input parameters. MOBILE is preferred by the MA DEP and used to develop motor vehicle emissions budgets for the SIP. The MOBILE input/output files are included in *Appendix I, Air Quality/Emissions Reduction*. In addition, *Chapter 5, Ground Transportation*, of this *2007 EDR* provides a discussion of the vehicle miles traveled (VMT) data used for this air quality analysis.
- **Other Sources —** Emissions associated with the fuel storage and handling, the central heating and cooling plant, and other stationary sources at Logan Airport were based on annual fuel throughput records for 2007, combined with EPA emission factors (Compilation of Air Pollution Emission Factors [AP-42]). When compared to 2006, deicing activities, natural gas, and snow melter usage showed increases of approximately 76 percent, 200 percent, and 88 percent, respectively, while the use of No. 6 fuel oil decreased by about 23 percent. These increases were expected, based upon the higher number of storms, increased snowfall and lower average temperatures in Boston during the severe winter season of 2007.
- **Particulate Matter —** Estimates of PM emissions associated with Logan Airport were first reported in the *2005 EDR* in response to the then recent availability of an FAA-updated method (e.g., first order approximation) for computing aircraft $PM_{10}/PM_{2.5}$ emission factors. $PM_{10}/PM_{2.5}$ emissions are now routinely reported in the EDRs/ESPRs including the *2006 EDR* and this *2007 EDR*.

Emissions Inventory for 2007

This section provides a summary of the 2007 Logan Airport emissions inventory for the pollutants VOC, CO, NO_x and $PM_{10}/PM_{2.5}$. Emissions of ozone are not directly computed as it is a secondary pollutant formed by emissions of NO_x and VOCs, which, serve as a surrogate for ozone formation. Emissions of SO_x and Pb are also not computed, as airport emission sources are very small generators of these two compounds. The aircraft emissions inventory was computed based on the actual number of aircraft operations (i.e., LTOs), fleet mix, and operational times-in-mode (TIM) at the Airport in 2007. Correspondingly, emissions associated with GSE, motor vehicles, fuel storage and transfer facilities, and a variety of stationary sources (i.e., steam boilers, snow melters, live fire training, back-up generators, etc.) associated with Logan Airport were also computed based on actual conditions.

As in preceding EDRs, the outcomes of the 2007 emissions inventory are compared with the results for 2006 and other previous years extending back to 1990. For ease of comparison in this EDR, the summary figures now contain the previous results in 5-year intervals for 1990, 1995 and 2000 and then annually for 2004, 2005, 2006 and 2007.[6] However, to show the most recent data and to be consistent with other sections of the EDR, the summary tables only contain the results for 2004 through 2007.[7] This way, the changes in Logan Airport air quality conditions can be evaluated in both the short- and long-term time frame and on a common basis. For

5 All vehicles and equipment (including GSE) that operate on the airfield must obtain a *Logan Airport Vehicle Aerodrome Permit*. The application form for this permit was modified in 2007 to request the fuel-type information (e.g., gasoline, diesel, etc.).

6 The results for the intervening years (i.e., 1995, 1996, 1997, etc.) are shown in previous EDRs and contained in *Appendix I, Air Quality/Emissions Reduction*.

7 For consistency, the 2007 analysis was conducted using both versions of the EDMS available in 2007: (v5.0.1) and (v5.0.2).

the AQI, estimates of 2015 NO_x emissions are also provided as a way of monitoring the progress of this voluntary emission management program.

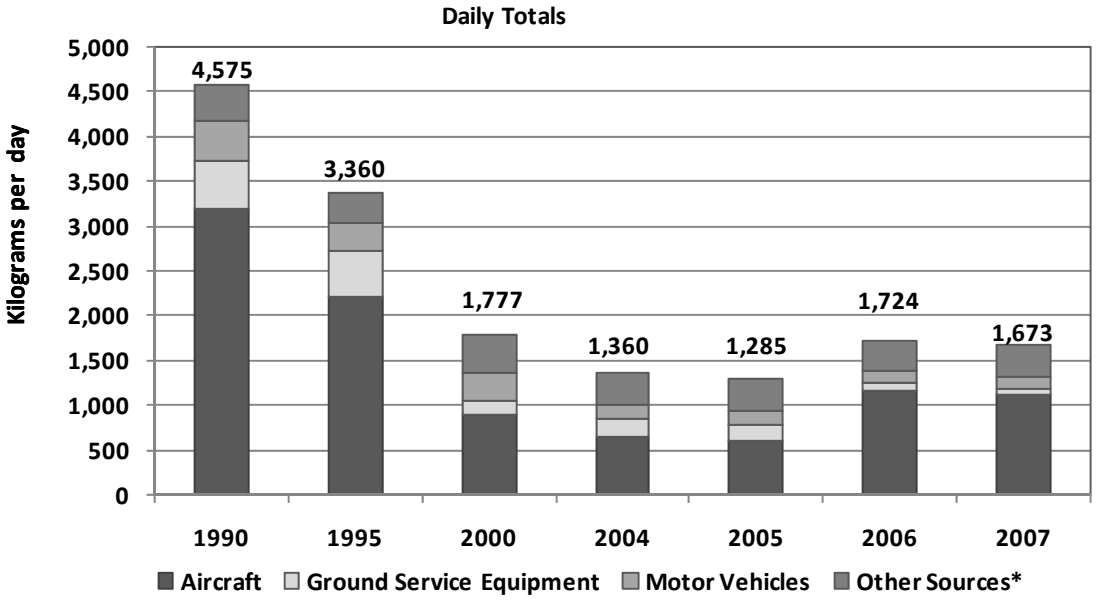
Volatile Organic Compounds

In 2007, total VOC emissions at Logan Airport were approximately 673 tpy (1,673 kg/day); an estimated decrease of approximately 3 percent from 2006 levels. This calculated decrease is largely due to the reduction in VOC emissions from commercial (air carrier) aircraft engines. Figure 7-1 depicts a long-term downward trend in VOC emissions at Logan Airport and Figure 7-2 shows the 2007 percent breakdown of these emissions by source category. Similarly, Table 7-4 shows the computed VOC emissions in kg/day for each emission source from 2004 to 2007. Other significant findings include the following:

- Total aircraft-related VOC emissions were approximately 5 percent lower in 2007, when compared to 2006. This decrease was largely due to the decrease in aircraft LTOs, changes in the aircraft fleet mix, and EDMS updates.
- GSE-related VOC emissions were approximately 1 percent higher in 2007 than in 2006. This apparent change is attributable to the improved database of GSE fuel types available for this analysis.
- Total VOC emissions from motor vehicles in 2007 also declined by approximately 3 percent from 2006 levels. The reduction in motor vehicle emissions is attributable to the lower emission factors of the 2007 motor vehicle fleet.
- VOC emissions from stationary and other sources (e.g., fuel storage/handling, central heating and cooling plant, snow melter usage and firefighter training) increased by approximately 2 percent from 2006 to 2007; mostly due to the increases in deicing, snow-melting and heating requirements at the Airport necessitated by the unusually snowy winter season of 2007.

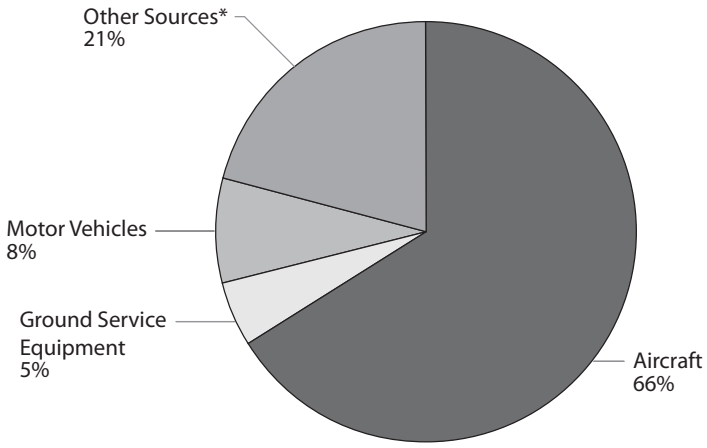
As shown in Figure 7-2, aircraft continue to represent the largest source (66 percent) of VOC emissions associated with Logan Airport, followed by stationary sources (21 percent), motor vehicles (8 percent), and GSE (5 percent). In summary, the results for 2007 contained in Table 7-4 show a 3 percent decrease of total emissions of VOCs when compared to 2006. This decrease is consistent with long-term trends at Logan Airport.

Figure 7-1 Emissions of VOC at Logan Airport



* Other sources include stationary sources (e.g., central heating and cooling plant, snow melter usage, fire training, etc.) and fueling sources.

Figure 7-2 Sources of VOC Emissions in 2007



* Other sources include stationary sources (e.g., central heating and cooling plant, snow melter usage, fire training, etc.) and fueling sources.

Table 7-4 Estimated VOC Emissions (in kg/day) at Logan Airport[1]

	2004	2005	2006[2]		2007[3]	
Aircraft/GSE Model	EDMS v4.21	EDMS v4.5		EDMS v5.0.1		EDMS v5.0.2
Motor Vehicle Model	MOBILE6.2.03					
Aircraft Sources						
Air carriers	292	271	227	511	435	381
Commuter aircraft	127	140	125	371	479	409
Cargo aircraft	110	41	19	46	129	112
General aviation	127	147	147	236	226	206
Total aircraft sources	656	599	518	1,164[4]	1,269	1,108
Ground Service Equipment[5]	187	178	167	77	78	78
Motor Vehicles						
Parking/curbside	38	37	33	33	31	31
On-airport vehicles	129	118	106	106	104	104
Total motor vehicle sources	167	155	139	139	135	135
Other Sources						
Fuel storage/handling	341	340	336	336	338	338
Miscellaneous sources[6]	9	13	8	8	14	14
Total other sources	350	353	344	344	352	352
Total Airport Sources	1,360	1,285	1,168	1,724	1,834	1,673

kg/day Kilograms per day. 1 kg/day is approximately equivalent to 0.40234 tons per year (tpy).
1 See *Appendix I, Air Quality/Emissions Reduction* for 1993 to 2003 emission inventory results.
2 Year 2006 emissions were computed using EDMS v5.0.1 and the previous v4.5 for a common–basis comparison to 2005.
3 Year 2007 emissions were computed using EDMS v5.0.2 and the previous v5.0.1 for a common–basis comparison to 2006.
4 The 2006 increase in aircraft VOC emissions is largely attributable to the addition of aircraft main engine startup emissions; a feature of EDMS v5.0.1 that did not exist in prior versions.
5 GSE emissions include vehicles and equipment converted to alternative fuels.
6 Includes the central heating and cooling plant, emergency electricity generation, snow melter usage and other stationary sources.

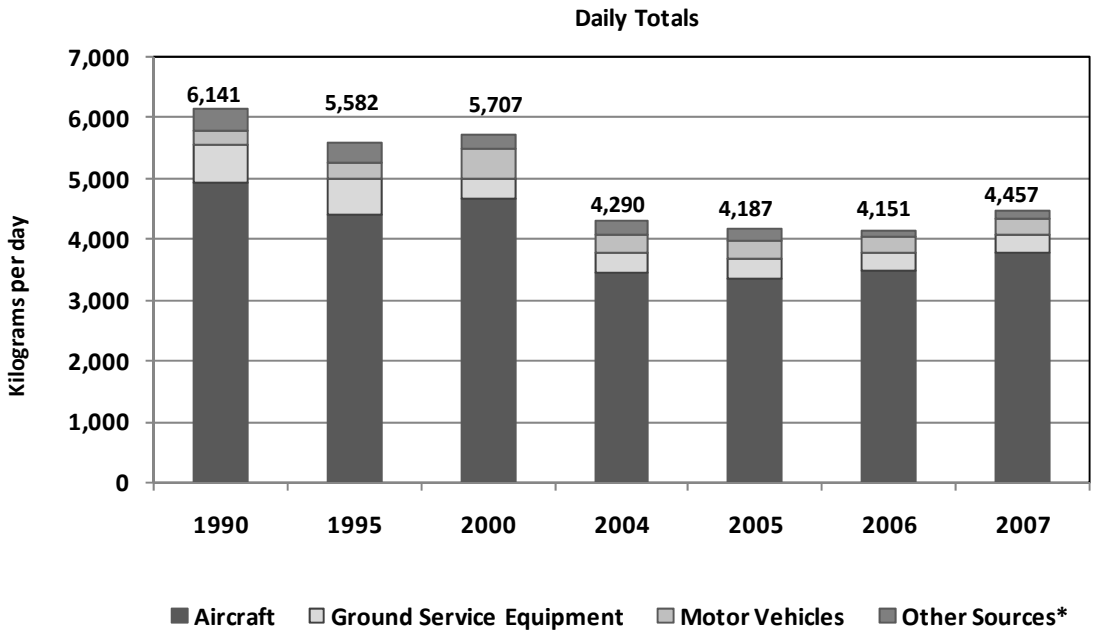
Oxides of Nitrogen

In 2007, total NO_X emissions from all Airport-related sources were estimated to be approximately 1,793 tpy (4,457 kg/day), which is a modeled increase of approximately 7 percent from 2006 levels. However, this also represents an overall decrease of 27 percent from 1999 levels, the benchmark of the AQI which is discussed later in this chapter. Figure 7-3 depicts these short- and long-term trends in NO_X emissions and Table 7-5 shows the allotment for each emission source in 2004, 2005, 2006 and 2007. Other findings include the following:

- When compared to 2006 levels, total aircraft-related NO_X emissions were 8 percent higher in 2007. This increase is largely due to the change in the aircraft fleet mix at Logan Airport and the additional aircraft-specific data in the updated version of EDMS (i.e., regional jets such as the CRJ-200, ERJ-135, ERJ-190 that were previously unavailable in earlier versions of EDMS and substituted with other similar aircraft types that are now included in EDMS v5.0.2).
- GSE emissions of NO_x decreased by less than 1 percent in 2007 compared to 2006, again, due mostly to the change in the aircraft fleet mix at Logan Airport, the expanded database of aircraft types in the newest version of EDMS, and the newly available GSE fuel type information obtainable from the Logan Airport vehicle registration program implemented by Massport.

- NO_x emissions from motor vehicles decreased by approximately 2 percent from 2006 levels. This reduction is attributable to the lower emission factors of the 2007 motor vehicle fleet.
- Stationary sources show an increase of 17 percent in NO_x emissions in 2007 compared to 2006. This is largely based on the overall increases in snow-melting and heating requirements at the Airport associated with the unusually snowy winter season of 2007.

Figure 7-3 Emissions of NO_x at Logan Airport



* Other sources include stationary sources (e.g., central heating and cooling plant, snow melter usage, firefighter training, etc.).

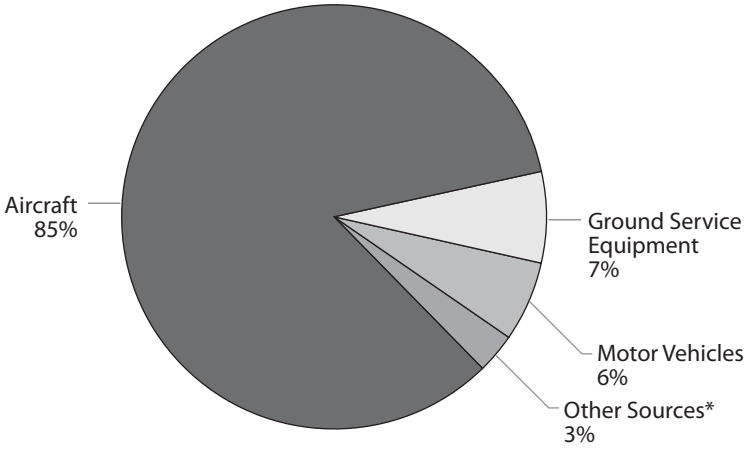
Table 7-5 Estimated NO_X Emissions (in kg/day) at Logan Airport[1]

	2004	2005	2006[2]		2007[3]	
Aircraft/GSE Model	EDMS v4.21	EDMS v4.5		EDMS v5.0.1		EDMS v5.0.2
Motor Vehicle Model	MOBILE6.2.03					
Aircraft Sources						
Air carriers	2,949	2,880	2,849	3,044	3,120	3,121
Commuter aircraft	245	225	195	256	353	354
Cargo aircraft	215	211	192	125	248	248
General aviation	49	50	49	60	56	56
Total aircraft sources	3,458	3,366	3,285	3,485	3,777	3,779
Ground Service Equipment[4]	333	312	280	300	299	299
Motor Vehicles						
Parking/curbside	21	22	19	19	18	18
On-airport vehicles	267	269	238	238	233	233
Total motor vehicle sources	288	291	257	257	251	251
Other Sources						
Fuel storage/handling[5]	0	0	0	0	0	0
Miscellaneous sources[6]	211	218	109	109	128	128
Total other sources	211	218	109	109	128	128
Total Airport Sources	4,290	4,187	3,931	4,151	4,455	4,457

kg/day kilograms per day. 1 kg/day is approximately equivalent to 0.40234 tons per year (tpy).
1 See *Appendix I, Air Quality/Emissions Reduction* for 1993 to 2003 emission inventory results.
2 Year 2006 emissions are computed using EDMS v5.0.1 and the previous version v4.5 for a common–basis comparison to 2005.
3 Year 2007 emissions were computed using EDMS v5.0.2 and the previous version v5.0.1 for a common–basis comparison to 2006.
4 GSE emissions include vehicles and equipment converted to alternative fuels.
5 Fuel storage/handling facilities are not a source of NO_x emissions.
6 Includes the central heating and cooling plant, emergency electricity generation, snow melter usage and other stationary sources.

As shown in Figure 7-4, in 2007, aircraft continued to represent the largest source (85 percent) of NO_x at Logan Airport, followed by GSE (7 percent), motor vehicles (6 percent), and stationary sources (3 percent).

Figure 7-4 Sources of NO_x Emissions in 2007



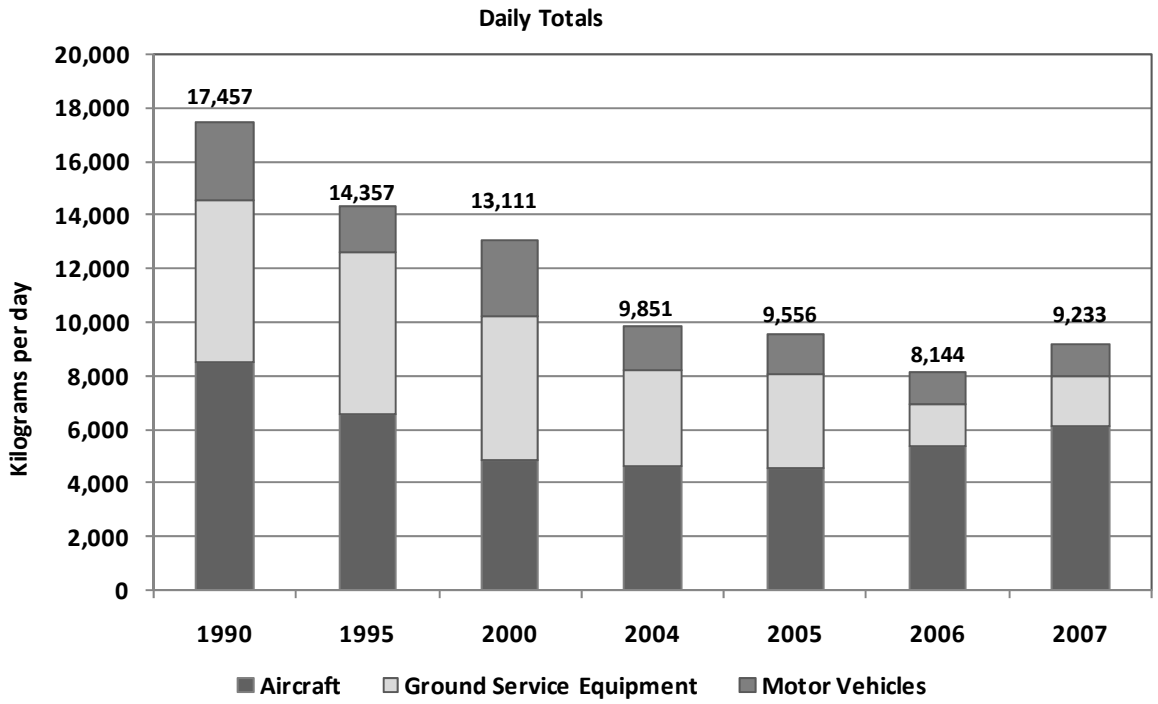
* Other sources include stationary sources (e.g., central heating and cooling plant, snow melter usage, fire training, etc.).
Values may not add to 100 percent due to rounding.

Carbon Monoxide

Total CO emissions at Logan Airport in 2007 were approximately 3,714 tpy (9,233 kg/day), or 13 percent higher than 2006 levels. However, Figure 7-5 still depicts a long-term downward trend (13 percent overall reduction from 1990 to 2007) in CO emissions at the Airport. Table 7-6 shows the breakdown of these emissions, by source category, for the years 2004 to 2007. The findings of the analysis show the following:

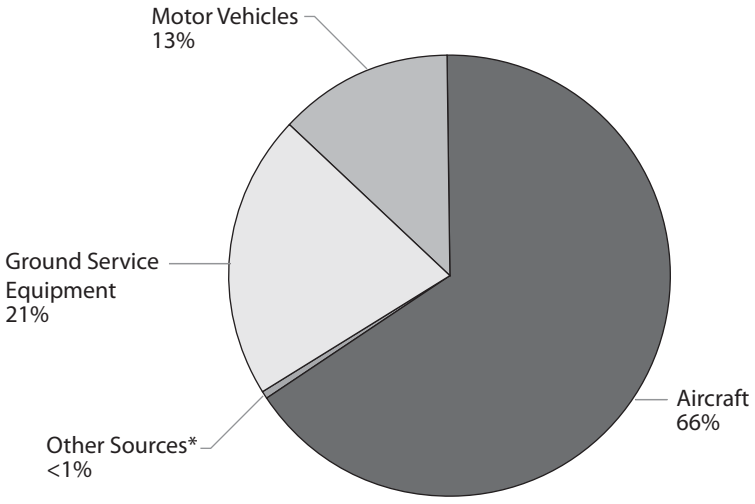
- Modeled aircraft-related CO emissions increased in 2007 by 14 percent compared to 2006 levels due to longer FAA-reported taxi/delay times for Logan Airport and the change in the EDMS aircraft fleet mix (i.e., select aircraft types that were previously substituted in EDMS are now included) for Logan Airport in 2007 when compared to 2006.
- Modeled GSE CO emissions also increased by approximately 20 percent in 2007 compared to 2006. Again, this is mostly due to the change in the aircraft fleet mix at Logan Airport, the expanded database of aircraft types in the newest version of EDMS, and the newly available GSE fuel type information.
- CO emissions from motor vehicles declined in 2007 by less than 1 percent from 2006 levels. This reduction is attributable to the lower emission factors of the motor vehicle fleet over this time period.
- Stationary source emissions of CO increased by 113 percent in 2007 compared to 2006. This is increase is attributable to the overall increases in space heating and snow melting requirements at the Airport during the winter of 2007. However, stationary sources represent less than 1 percent of the overall total of CO emissions at the Airport.

Figure 7-5 Emissions of CO at Logan Airport



As shown in Figure 7-6, aircraft continued to represent the largest source (66 percent) of CO at Logan Airport in 2007, followed by GSE (21 percent), motor vehicles (13 percent), and stationary sources (less than 1 percent).

Figure 7-6 Sources of CO Emissions in 2007



* Other sources include stationary sources (e.g., central heating and cooling plant, snow melter usage, fire training, etc.).

Table 7-6 Estimated CO Emissions (in kg/day) at Logan Airport[1]

	2004	2005	2006[2]		2007[3]	
Aircraft/GSE Model	EDMS v4.21	EDMS v4.5		EDMS v5.0.1		EDMS v5.0.2
Motor Vehicle Model	MOBILE6.2.03					
Aircraft Sources						
Air carriers	2,985	2,895	2,828	3,167	2,973	2,973
Commuter aircraft	1,010	1,010	950	1,587	2,484	2,484
Cargo aircraft	229	174	138	158	241	241
General aviation	416	437	398	442	401	403
Total aircraft sources	4,640	4,516	4,314	5,354	6,099	6,101
Ground Service Equipment[4]	3,586	3,531	3,409	1,586	1,904	1,904
Motor Vehicles						
Parking/curbside	180	179	144	144	139	139
On-airport vehicles	1,412	1,290	1,036	1,036	1,038	1,038
Total motor vehicle sources	1,592	1,469	1,180	1,180	1,177	1,177
Other Sources						
Fuel storage/handling[5]	0	0	0	0	0	0
Miscellaneous sources[6]	33	40	24	24	51	51
Total other sources	33	40	24	24	51	51
Total Airport Sources	9,851	9,556	8,927	8,144	9,231	9,233

kg/day kilograms per day. 1 kg/day is approximately equivalent to 0.40234 tons per year (tpy).
1 See *Appendix I, Air Quality/Emissions Reduction* for 1993 to 2003 emission inventory results.
2 Year 2006 emissions are computed using EDMS v5.0.1 and the previous version v4.5 for a common basis comparison to 2005.
3 Year 2007 emissions were computed using EDMS v5.0.2 and the previous version v5.0.1 for a common –basis comparison to 2006.
4 GSE emissions include vehicles and equipment converted to alternative fuels.
5 Fuel storage/handling facilities are not a source of CO emissions.
6 Includes the central heating and cooling plant, emergency electricity generation, snow melter usage and other stationary sources.

Particulate Matter

Table 7-7 shows that total estimated $PM_{10}/PM_{2.5}$ emissions at Logan Airport in 2007 were approximately 52 tpy (128kg/day). This represents an approximate 64 percent increase over the 2006 modeled levels and is mostly attributable to a change in the EDMS model, which now includes PM formation from sulfates in aircraft exhaust. When using the prior version of EDMS (v5.0.1), total Airport-related emissions of $PM_{10}/PM_{2.5}$ are shown to increase by only 5 percent in 2007 compared to 2006. Other findings of the analysis include the following:

- Modeled aircraft-related $PM_{10}/PM_{2.5}$ emissions increased approximately 109 percent in 2007 compared to 2006 levels. This is due mostly to the updated method by which EDMS v5.0.2 calculates $PM_{10}/PM_{2.5}$ emissions (i.e., first order approximation, FOA3a). Advancements and changes occur regularly as new aircraft engine emissions data are collected and incorporated into EDMS by the FAA. The slightly longer aircraft taxi-in/delay TIM for Logan Airport in 2007 compared to 2006 also played a role in this outcome.
- GSE $PM_{10}/PM_{2.5}$ emissions increased by approximately 11 percent in 2007 mostly due to updated GSE fuel type information available for this analysis.
- $PM_{10}/PM_{2.5}$ emissions from motor vehicles did not change significantly from 2006 to 2007.
- Stationary source emissions of $PM_{10}/PM_{2.5}$ increased by 6 percent in 2007 compared with 2006, which is attributable to the increases in space heating and snow melting at the Airport during the winter of 2007.

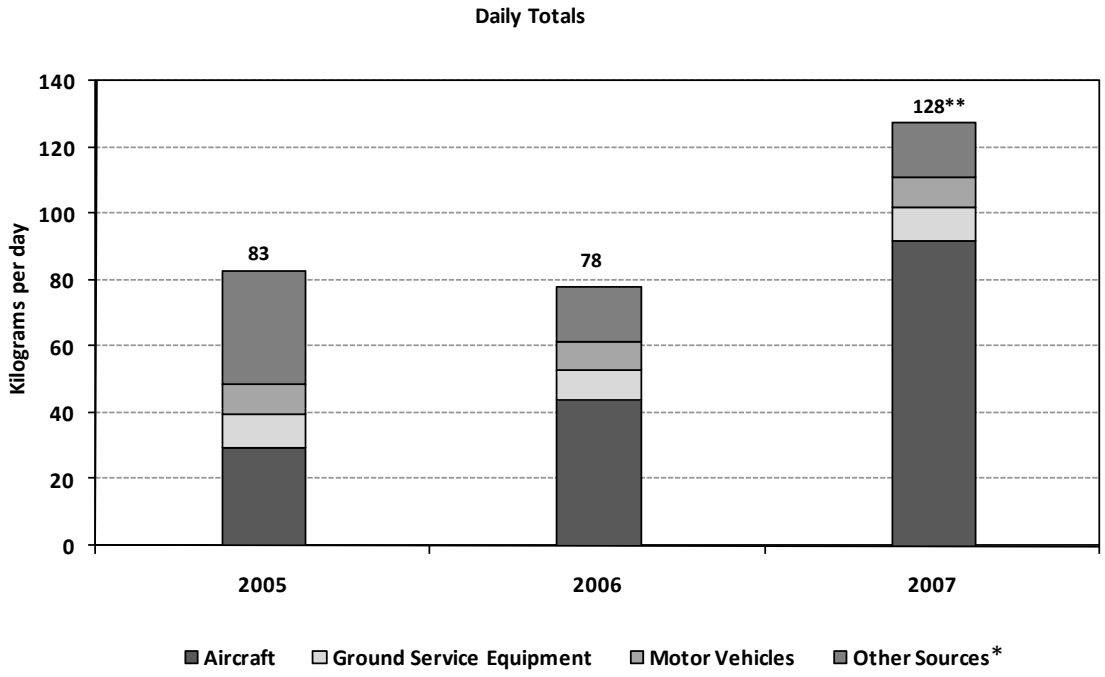
Table 7-7 Estimated $PM_{10}/PM_{2.5}$ Emissions (in kg/day) at Logan Airport[1]

	2005[2]	2006[3]		2007[4]	
Aircraft/GSE Model	EDMS v4.5		EDMS v5.0.1		EDMS v5.0.2
Motor Vehicle Model	MOBILE6.2.03				
Aircraft Sources					
Air carriers	25	25	38	35	67
Commuter aircraft	1	1	2	6	14
Cargo aircraft	2	3	2	3	6
General aviation	2	2	2	2	5
Total aircraft sources	30	31	44	46	92
Ground Service Equipment[5]	11	9	9	10	10
Motor Vehicles					
Parking/curbside	1	1	1	<1	<1
On-airport vehicles	8	8	8	9	9
Total motor vehicle sources	9	9	9	9	9
Other Sources					
Fuel storage/handling[6]	0	0	0	0	0
Miscellaneous sources[7]	34	16	16	17	17
Total other sources	34	16	16	17	17
Total Airport Sources	84	65	78	82	128

kg/day kilograms per day. 1 kg/day is approximately equivalent to 0.40234 tons per year (tpy)
PM particulate matter
1 It is assumed that all PM are less than 2.5 microns in diameter ($PM_{2.5}$).
2 2005 is the first year that $PM_{10}/PM_{2.5}$ emissions were included in the Logan ESPR/EDR emission inventories.
3 Year 2006 emissions are computed using EDMS v5.0.1 and the previous version v4.5 for a common–basis comparison to 2005.
4 Year 2007 emissions were computed using EDMS v5.0.2 and the previous version v5.0.1 for a common–basis comparison to 2006.
5 GSE emissions include vehicles and equipment converted to alternative fuels.
6 Fuel storage and handling facilities are not sources of PM emissions.
7 Includes the central heating and cooling plant, emergency electricity generation, fire training, snow melters, and other stationary sources.

As shown in Figures 7-7 and 7-8, aircraft represent the largest (72 percent) source of $PM_{10}/PM_{2.5}$ followed by stationary sources (e.g., central heating and cooling plant, snow melter usage, fire training, etc.) (13 percent), GSE (8 percent), and motor vehicles (7 percent).

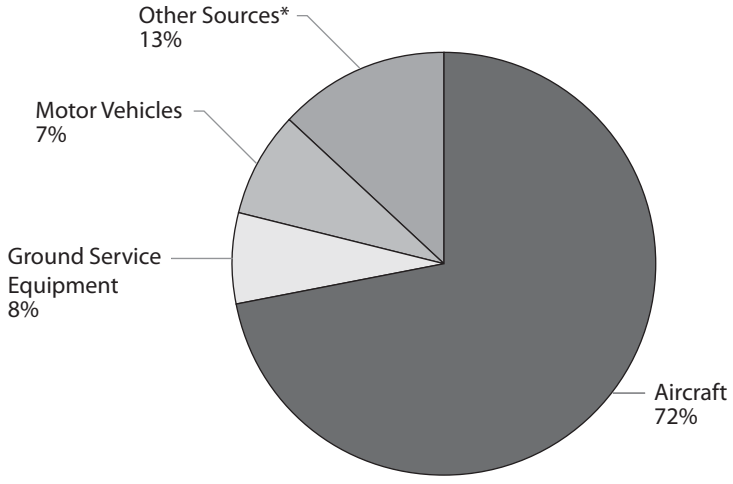
Figure 7-7 Emissions of PM at Logan Airport



* Other sources include stationary sources (e.g., central heating and cooling plant, snow melter usage, fire training, etc.).

** In 2007, 46 kg per day of PM emissions were attributable to changes in the model.

Figure 7-8 Sources of $PM_{2.5}$ Emissions in 2007



* Other sources include stationary sources (e.g., central heating and cooling plant, snow melter usage, fire training, etc.).

Measured NO_2 Concentrations

This section presents the results of Massport's ambient (i.e., outdoor) air quality monitoring program for NO_2, a pollutant associated with aircraft activity. Since 1982, Massport has been collecting NO_2 concentration data at numerous locations both on the Airport and in neighboring residential communities. The purpose of this monitoring program is to track long-term trends in NO_2 levels and to compare the results to the NAAQS for this pollutant.

The protocol for this monitoring program calls for the collection of samples using passive diffusion tube technology for a period of one week each month for 12 months of the year at each of the monitoring stations. The samples, along with Quality Assurance/Quality Control (QA/QC) samples, are then analyzed in a laboratory.

Table 7-8 presents the 2007 NO_2 monitoring data in micrograms/cubic meter ($\mu g/m^3$) and Figure 7-9 depicts the locations of the 27 sites currently in the Massport NO_2 monitoring network. For comparative purposes, historic data from 1999 to 2006 are also shown in Table 7-5. The table also includes NO_2 data collected separately by the MA DEP using continuous monitors at four Boston-area locations (Figure 7-9).

As shown in Table 7-8, there is an ongoing trend of decreasing NO_2 concentrations at both the Massport and MA DEP monitoring sites. Other observations of the 2007 data show that:

- Annual NO_2 concentrations at all Massport and MA DEP monitoring locations were below the annual NO_2 NAAQS of 100 micrograms per cubic meter in 2007.
- The highest NO_2 concentrations in 2007 from the Massport program occurred in areas characterized by high levels of motor vehicle traffic (i.e., Main Terminal Area [Site 8] and Maverick Square [Site 12]).
- The NO_2 concentrations were lower at all Massport and MA DEP monitoring locations in 2007 when compared to 2006, with the single exception being the MA DEP Harrison Avenue Site B.

Spatial and temporal changes in measured NO_2 levels from year to year are typical and should not be used to define short-term results. Rather, NO_2 levels should be assessed by looking at the trends over several years.

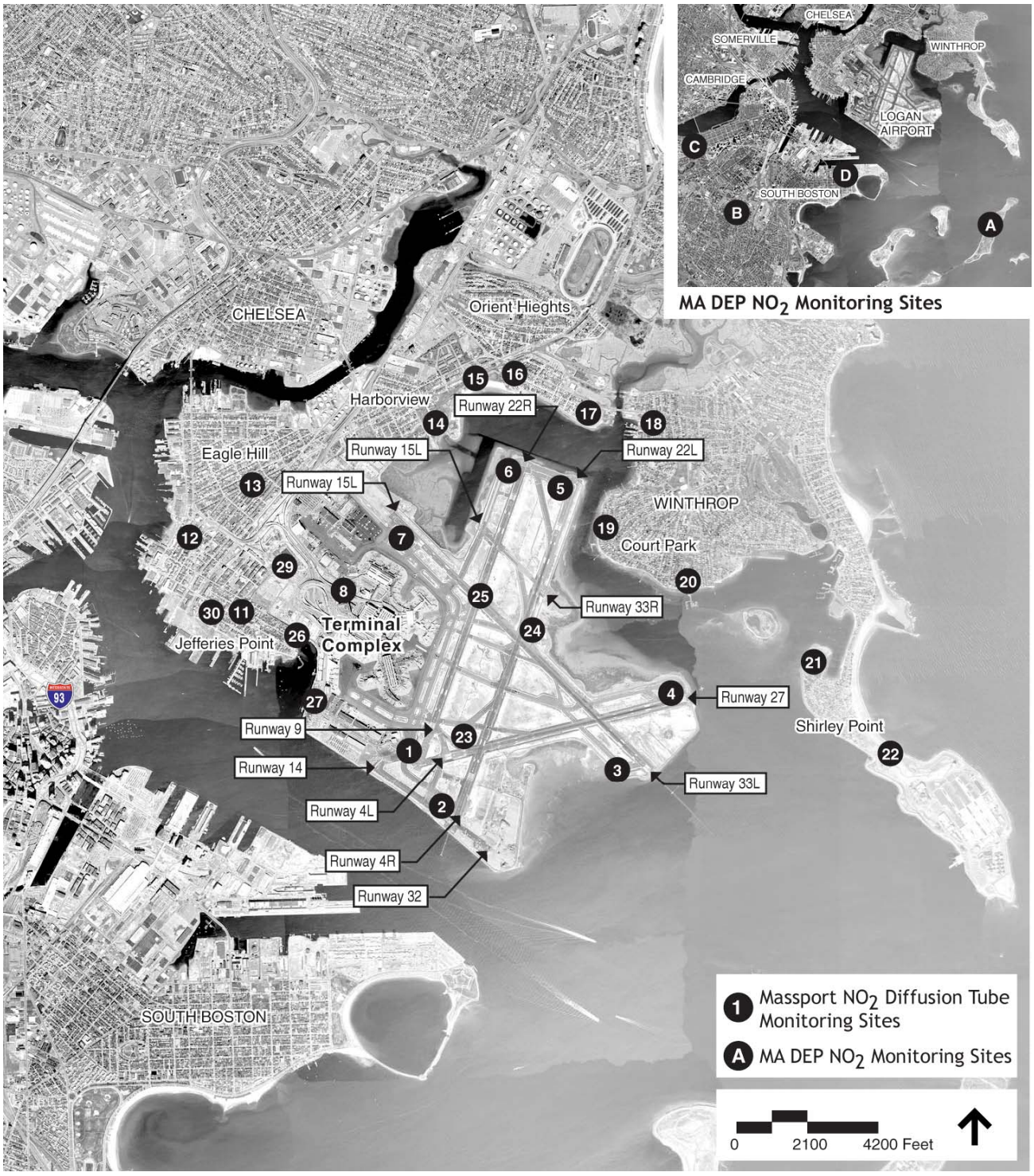
Table 7-8 Massport Annual NO_2 Concentration Monitoring Results ($\mu g/m^3$)

Monitoring Site	Site No.	Year								
		1999	2000	2001	2002	2003	2004	2005	2006	2007
Massport Monitoring Sites										
Runway 9	1	61.0	58.2	41.6	45.8	33.9	30.1	35.0	31.9	17.3
Runway 4R	2	55.6	44.6	41.4	36.9	32.5	30.9	30.7	29.0	17.2
Runway 33L	3	47.7	42.6	39.4	33.3	30.8	25.4	24.5	26.3	24.2
Runway 27	4	42.9	37.8	35.8	30.3	25.5	24.1	22.7	22.3	16.9
Runaway 22L	5	47.5	39.8	38.2	33.8	27.8	23.7	22.1	24.9	17.1
Runway 22R	6	60.6	59.2	51.6	45.0	32.3	29.7	32.9	25.1	24.8
Runway 15R	7	47.0	43.4	44.3	42.6	40.8	28.7	27.7	28.7	20.5
Main Terminal Area	8	70.8	87.0	80.7	69.3	44.3	44.7	46.2	43.5	29.5
Webster St., Jeffries Point	11	52.4	45.5	43.4	39.1	32.5	28.3	31.3	31.3	22.7
Maverick Square, E. Boston	12	81.2	72.2	68.5	61.3	47.9	46.5	41.4	45.6	36.0
Bremen St., E. Boston	13	59.1	52.6	52.0	46.2	39.1	35.7	37.6	37.1	27.8
Shore St. E. Boston	14	45.7	38.5	38.8	35.0	27.2	24.0	24.9	22.4	18.1
Orient Heights Yacht Club	15	45.1	46.9	47.7	43.1	29.4	25.2	25.5	25.1	19.6
Bayswater St. E. Boston	16	45.2	45.5	48.3	41.2	28.4	22.8	30.4	23.1	18.4
Annavoy St. E. Boston	17	40.8	39.2	44.4	33.7	24.7	21.4	23.3	21.0	18.2
Pleasant St. Winthrop	18	42.0	39.3	37.8	32.3	27.9	22.6	23.4	21.4	17.8
Court Road, Winthrop	19	40.0	36.1	33.8	27.4	24.0	19.2	22.3	21.0	16.3
Cottage Park Yacht Club	20	37.1	50.9	45.9	36.7	22.5	19.1	27.7	21.4	16.3
Winthrop, Point Shirley	21	33.1	37.7	38.6	24.4	22.7	17.4	17.2	20.2	15.7
Deer Island	22	36.3	31.9	33.8	33.1	21.3	17.8	16.9	17.8	13.0
Runway 4R–9	23	42.2	66.0	42.3	33.4	28.6	24.1	27.1	26.3	19.2
Runway 33L–4R	24	44.3	41.7	41.8	33.5	28.1	24.3	22.3	25.7	20.9
Runway 22R–33L	25	62.4	50.3	49.4	42.2	33.8	31.7	29.4	34.5	22.9
Jeffries Point Park/Marginal St.	26	68.6	49.8	45.0	42.0	35.2	30.5	32.5	31.7	24.4
Harborwalk	27	54.3	48.5	47.4	43.5	35.6	35.5	29.3	34.2	24.2
Logan Athletic Fields	29	-	69.1	67.6	54.9	41.9	40.2	37.5	37.0	24.6
Brophy Park, Jeffries Point	30	-	48.0	45.2	41.0	36.5	31.2	32.9	31.3	24.8
Average of all Monitoring Sites		50.5	50.5	47.5	40.0	31.7	28.0	28.7	28.7	21.0
MA DEP Monitoring Sites[1]										
Long Island Rd (MA DEP)	A	20.7	24.4	22.6	22.6	16.9	12.6	13.2	13.2	13.2
Harrison Ave. (MA DEP)	B	NA	45.1	47.0	45.1	43.2	37.4	35.8	35.8	37.7
Kenmore Square (MA DEP)	C	56.4	54.5	56.8	47.0	47.0	51.7	43.3	43.3	39.6
East First Street (MA DEP)	D	39.5	37.6	43.2	39.5	39.5	36.8	33.9	39.6	37.7

Notes: The NAAQS is 100 $\mu g/m^3$.
The site identification labels in Figure 7-9 are keyed to the site labels in this table.

$\mu g/m^3$ micrograms/cubic meter.
NA Not available.
1 NO_2 monitoring sites operated by the MA DEP.

Figure 7-9 Massport NO_2 Monitoring Sites



Air Quality Emissions Reduction

As part of the in-place and ongoing Logan Airport Air Quality Management Plan, Massport has established a number of goals and objectives to address air emissions from Airport operations including the minimization of Airport-related emissions through the AQI and the reduction of GSE and Massport fleet emissions with AFV. This section presents a 2007 update on the AQI and the AFV Program at Logan Airport.

Air Quality Initiative

Massport developed the AQI as a 15-year voluntary program with the overall goal to maintain NO_x emissions associated with Logan Airport at, or below, 1999 levels. The AQI has four primary commitments, shown below, along with Massport's progress in meeting the AQI commitments.

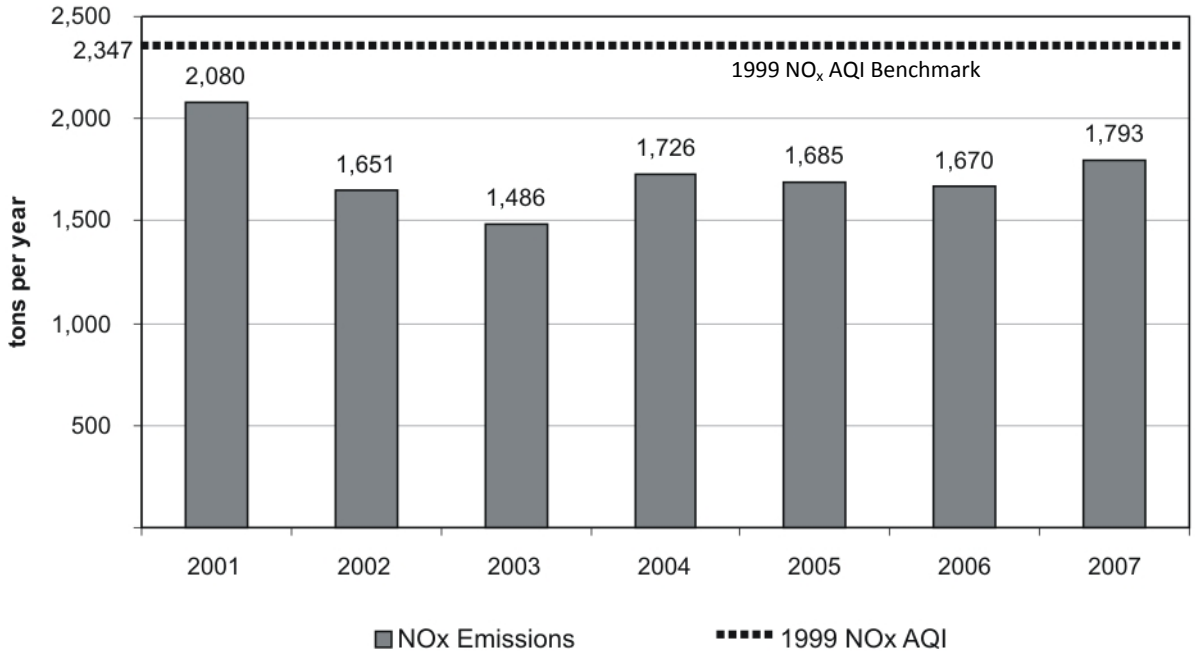
- **Expand on the initiatives already in-place at Logan Airport.** See Table 7-9 for the initiatives in place at the time the AQI was developed.
- **As necessary to maintain NO_x emissions at, or below, 1999 levels, retire emissions credits, giving priority to mobile sources.** Massport updates the Logan Airport inventory of NO_x emissions annually to reflect new information and changing conditions associated with the Airport's operations. Table 7-9 presents the updated emissions inventory and shows that, in 2007, it was not necessary to retire emission credits to maintain NO_x emissions at or below 1999 levels.
- **Report the status and progress of the AQI in the ESPR or EDR.** Massport does so here and has done so in each Logan Airport EDR and ESPR since 2001 (Table 7-9).
- **Continue to work at international and national levels to decrease air emissions from aviation sources.** Massport maintains memberships and active participation in a number of organizations involved in addressing aviation-related environmental issues, including air quality. These include serving on technical review committees for the Transportation Research Board (TRB), research projects and environmental committees of the American Association of Airport Executives (AAAE), and Airports Council International (ACI).

In addition, in August 2006, in an effort to reduce emissions associated with aircraft taxiing, Massport sent letters to all airlines operating at Logan Airport encouraging the voluntary use of single-engine taxiing, consistent with safety, pilot judgment, and federal law.

As shown in Table 7-9, NO_x emissions at Logan Airport in 2007 (net total with reductions) were approximately 554 tpy lower than 1999 levels. This represents a 24 percent decrease since 1999. Between 1999 and 2007, the greatest reductions of NO_X emissions were associated with aircraft, GSE, and on-airport motor vehicles: 19 percent, 33 percent, and 51 percent reductions, respectively.

Figure 7-10 compares the 1999 threshold level of 2,347 tpy of NO_X emissions to modeled NO_x emissions for 2001 through 2007. Cumulatively, as of December 31, 2007, NO_x emissions at Logan Airport were approximately 4,414 tons below the benchmark set by the AQI. As shown in Table 7-9, based upon current projections, Massport expects that no credits will need to be purchased through the AQI period of 2015 since the emission inventory is projected to be below the 1999 threshold of 2,347 tpy through 2015.

Figure 7-10 NO_x Emissions Compared to AQI[1]



1 Includes emission reductions from the use of Alternative Fuel Vehicles/shuttle buses, and electric ground service equipment. See Table 7-9.

As part of the reporting process, the AQI calls for an itemization of NO_x emissions generated by activities at Logan Airport according to the individual airline operator. Table 7-10 shows the estimated amounts of NO_x air emissions generated by each airline in units of tons per year and tons per LTO. Each LTO consists of taxiing, queuing, takeoff, climb out, approach, and landing operations. The comparison of LTO emissions may not be relevant to any assessment of any specific airlines overall environmental performance.

Table 7-9 AQI Inventory Tracking of NO_x Emissions (in tpy)[1] for Logan Airport

	Actual Conditions[2]									Forecasted Conditions[2]							
	1999[3]	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Total Annual Emissions	2,347[4]	2,315	2,097	1,665	1,499	1,745	1,703	1,688	1,806	1,885	1,920	1,955	1,991	2,026	2,061	2,096	2,131
Above (Below) 1999 Levels Before Reductions	NA	(32)	(250)	(682)	(848)	(602)	(644)	(659)	(541)	(462)	(427)	(392)	(356)	(321)	(286)	(251)	(216)
Potential Reductions/Increases[5]																	
Alternative Fuel Vehicles/Shuttle Bus	(11)	(4)	(4)	(3)	(3)	(10)	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)	0	1
Alternate Fuel Ground Service Equipment[6]	(14)	(14)	(13)	(11)	(10)	(9)	(9)	(10)	(6)	(10)	(10)	(10)	(10)	(10)	(11)	(11)	(11)
Total Potential Reductions	(25)	(19)	(17)	(14)	(13)	(19)	(18)	(18)	(13)	(16)	(15)	(14)	(13)	(13)	(12)	(11)	(10)
Above (Below) 1999 Levels After Reduction	(25)	(51)	(267)	(696)	(861)	(621)	(662)	(677)	(554)	(478)	(442)	(406)	(370)	(334)	(298)	(262)	(226)
Credit Trading[7]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Net Total w/Reductions and Credits	2,322	2,296	2,080	1,651	1,486	1,726	1,685	1,670	1,793	1,870	1,905	1,941	1,977	2,013	2,049	2,085	2,121

Notes: Values in parentheses, such as "(250)" are negative values. Values without parentheses are positive values.

NA Not applicable.

1 For consistency with the AQI, the NO_x emission values in this table are reported in tpy. The EDR/ESPR Emissions Inventory values are reported in kg/day. A conversion factor of 0.40234 is used to convert kg/day to tpy.

2 1999 and 2004 analysis years were updated in the *2004 ESPR* using EDMS v4.21. The 2000 and 2001 analyses were completed using EDMS v4.03 and MOBILE6. The 2002 to 2003 analyses were completed using EDMS v4.11 and MOBILE6. The 2004 analysis was completed using EDMS v4.21 and MOBILE6.2.01. The 2005 analysis was completed using EDMS v4.5 and MOBILE6.2.03. The 2006 analysis was completed using EDMS v5.0.1 and MOBILE6.2.03. The 2007 analysis was completed using EDMS v5.02 and MOBILE6.2.03. The years 2008 through 2015 were interpolated using the 2020 analysis provided in Table 7-9 of the *2004 ESPR*.

3 The year 1999 is the "baseline" year for the AQI. Thus, 2,347 tons/year is considered the AQI threshold for NO_x emissions.

4 The original value of 2,235 tons/year in the AQI was based on the *2001 EDR* results and EDMS v4.03. This value was updated in the *2004 ESPR* using EDMS v4.21.

5 Other initiatives that Massport and Logan Airport tenants may use for possible emission reductions include: Consolidated Car Rental Facility, central heating and cooling plant Boilers, 400-Hz power at gates and low NO_x fuels in Logan Express buses.

6 Massport's current plan for the conversion of GSE to alternative fuels is being re-evaluated based on the new diesel rule (2007). GSE AFV credits were based on fuel type data obtained from the aerodrome vehicle permit applications.

7 Since the AQI threshold is not exceeded in 2007, nor are the emissions expected to exceed the threshold in the near future, no credits will need to be purchased in the immediate term. Emissions will be reevaluated each year, with a revised projection for 2015 in the next *ESPR*.

Table 7-10 Contribution of NO_x Air Emissions by Airline in 2007 (Estimated)

Air Carrier, by Airline	Total Emissions (tons/year) LTOs	NO_x	Normalized Emissions (tons/LTO) NO_x per LTO
Aer Lingus	610	25.90	0.042
Aeromexico	65	0.73	0.011
Air Canada[1]	5,938	13.21	0.002
Air France	478	17.84	0.037
Air Transport International	16	0.30	0.019
Airnet	18	0.01	<0.001
Airtran Airways	9,346	89.71	0.010
Alaska Airlines	711	9.95	0.014
Alitalia	443	12.23	0.028
American Airlines[2]	27,619	258.24	0.009
American Trans Air	10	0.11	0.011
Astar Air Cargo	498	4.39	0.009
British Airways	1,080	67.70	0.063
Cape Air	13,273	0.22	<0.001
Capital Cargo International	190	1.63	0.009
Champion Air	34	0.29	0.009
Colgan Air	7,002	3.18	<0.001
Continental[3]	8,467	47.45	0.006
Cougar Leasing	112	1.29	0.012
Delta Airlines[4]	38,381	192.08	0.005
Federal Express	2,304	69.44	0.030
Finnair	33	0.37	0.011
Frontier	2	0.02	0.008
General Aviation	14,316	22.52	0.002
Iberia	152	6.65	0.044
Icelandair	434	4.99	0.011
JetBlue	18,147	182.59	0.010
Kitty Hawk Air Cargo	242	1.82	0.008
Lufthansa	758	28.85	0.038
Mesa Airlines	1,211	2.16	0.002
Miami Air	164	2.30	0.014
Midwest Airlines	2,357	20.31	0.009
North American	97	1.14	0.012
Northwest Airlines[5]	6,498	64.43	0.010
Omni Air	16	0.06	0.004
Other Cargo	7	0.19	0.027
Other Charter	34	0.21	0.006
Other International	31	0.68	0.022
Pace	19	0.13	0.007
Royal Air Freight	8	<0.01	<0.001
Ryan International	40	0.41	0.010
SATA International	197	4.15	0.021
Saudi Arabian	10	0.27	0.027
Sky King	20	0.14	0.007
Skylink Aviation	260	0.05	<0.001
Spirit	898	7.53	0.008
Swissair	361	11.72	0.032
United Airlines	10,161	106.81	0.011
UPS Airlines	674	18.81	0.028
U.S. Airways[6]	25,516	195.19	0.008
USA 3000	10	0.12	0.012
Virgin Atlantic	366	15.99	0.044
Wrangler Aviation	36	1.03	0.029
Xtra	63	0.91	0.014
Yangtze River Express	36	1.82	0.050
Totals	199,769	1,520.24	0.008

Notes: Other Cargo may include: Airborne Express, Cargolux, etc.
Other Charter may include: Sun Country, Twin Jet, etc.
Other International may include: Air China, Cathay Pacific, etc.
The "Other" Categories may include airlines with less than 10 operations.
Normalized emissions are based on a Landing and Takeoff Cycle (LTO).
This list combines the major airlines with their commuters (i.e., Comair with Delta Air Lines, American Eagle with American, etc.).

1 Includes Jazz.
2 Includes American Eagle.
3 Includes Commutair and Britt Airways (doing business as Continental Express).
4 Includes Atlantic Southeast, Big Sky, Chautauqua, Comair, Freedom, and Shuttle America (doing business as Delta Connection).
5 Includes Express Airlines I (doing business as Northwest Airlink).
6 Includes Air Wisconsin, America West, Jetstream International (doing business as US Airways Express), Piedmont, and Republic.

Based on the information shown in Table 7-10, international carriers are the higher NO_x emitters per LTO because their longer stage lengths require aircraft equipped with larger and/or additional engines. Overall, international carriers emit 14 percent of the total aircraft NO_x emissions at Logan Airport. Other results include:

- Carriers with the greatest number of flights tended to generate the highest percentage of total NO_x emissions

- Combined, the four largest air carriers (by LTO), emitted 53 percent of the total aircraft NO_x emissions
- Commercial airlines (excludes cargo and GA) accounted for 92 percent of total aircraft NO_x emissions
- Cargo aircraft operators accounted for 6.5 percent of total aircraft NO_x emissions
- GA aircraft accounted for 1.5 percent of total aircraft NO_x emissions

Alternative Fuel Vehicles Program

Another element of Massport's Air Quality Management Program is the AFV Program. The AFV Program is designed to replace conventionally-fueled fleet with alternative fuel vehicles, when feasible, to help reduce emissions associated with Logan Airport operations. To support its fleet of alternative fuel vehicles, Massport has developed and maintains an electric vehicle support infrastructure with numerous charging spaces and inductive chargers at key locations at the Airport. For the past 13 years, Massport has also had a privately-operated compressed natural gas (CNG) station on site (located on the north side of the Airport near the Economy Parking Lot). This station is the largest CNG station in New England, primarily supports Massport's fleet of 26 shuttle buses, and is open to the public. In 2007, the Logan Airport CNG station dispensed approximately 29,800 gallon-equivalents per month. In 2007, Massport conducted a detailed audit of its alternative fuel vehicles. Table 7-11 reports the results of this audit, showing the number of Massport AFVs by vehicle type and the number of vehicles Massport added to and removed from its fleet in 2007.

Table 7-11 Massport's Alternative Fuel Vehicle Fleet Inventory at Logan Airport as of December 31, 2007

Fuel Type	Vehicle	Number
Electric	Pool Vehicle	1
	Solectria Citivan Stepvan	2
	Off-road vehicles	10
	Minibus	1
Compressed Natural Gas (CNG)	Ford Crown Victoria	1
	Econoline Van	3
	Pick-Up Truck	5
	Honda Civic	3
	Shuttle Bus[1]	26
	Wheelchair Lift Cut Away Bus	1
Gasoline/Electric Hybrid	Ford Escape	3
Propane	Non-Road Vehicles (Forklifts)	2
	Total	58
	Total acquired in 2007	2
	Total disposed of in 2007[1]	5

Source: Massport.
1 In June of 2005, the Silver Line, the state's first rapid bus transit service, began operating and demand for Massport shuttle bus service decreased. Since then, Massport retired a number of CNG shuttle buses.

Two new AFVs (hybrids) were acquired in 2007. One electric pool vehicle and four off-road vehicles were retired in 2007. Massport also retired a number of CNG shuttle buses. Massport now operates 58 vehicles powered by CNG, propane, or electricity, or operates hybrids powered by gasoline and alternative power sources. Massport established a vehicle procurement policy in 2006 that requires consideration of AFVs when purchases are made.

Air Quality Management Status

Massport's air quality management program focuses on decreasing emissions, when feasible, from all Airport-related sources, in addition to studying innovative means to achieve emissions reductions. Massport's air quality improvement goals, the measures proposed to accomplish them, and some 2007 milestones are presented in Table 7-12.

Table 7-12 Air Quality Management Plan Status

Air Quality Emissions Reduction Goals	Plan Elements	2007 Status
Reduce emissions from Massport fleet vehicles	Convert Massport fleet vehicles to electricity or CNG by retrofitting or procurement.	Massport continues to procure AFVs and substitute them for conventionally fueled vehicles, when feasible. Two hybrid vehicles were purchased in 2007 and five were retired. Massport uses the Energy Policy Act (EPAct) of 1992 to expedite Massport's AFV program. Under EPAct, Massport is required to purchase 75 percent of its light-duty vehicles as AFVs. Public safety vehicles are excluded from this requirement. Total accrued banked EPAct credits were 27 in 2007.
Encourage use of alternative-fuel vehicles by private fleet and airside service vehicle owners	Provide infrastructure to support alternative fuels including CNG and electricity.	Massport continues to operate New England's largest CNG station, which is open to the public. In 2007, the CNG station dispensed approximately 29,800 gallon equivalents per month, serving over 100 vehicles daily. Massport also continues to maintain an extensive electric vehicle charging infrastructure. The electric charging infrastructure includes 15 inductive charging stations and eight dedicated conductive charging parking spaces.
	Work with ground access fleet and airside service-vehicle owners to encourage conversion.	Massport encourages conversion to AFVs by others through such policies as 50 percent discounts in AFV ground access fees to limousines, vans, and buses; limited "front-of-line" taxi pool privileges to hybrid and AFVs; and preferred parking for hybrid and AFVs at Logan Airport parking facilities.
	Use of pre-conditioned air (PCA) at new and renovated terminals and terminal gates.	100 percent of the contact gates have PCA and 400-Hz power. This reduces the need for Auxiliary Power Units (APUs) and, consequently, reduces associated emissions.

Table 7-12 Air Quality Management Plan Status (Continued)

Air Quality Emissions Reduction Goals	Plan Elements	2007 Status
Minimize emissions from motor vehicles	Implement a program to increase high occupancy vehicle (HOV) ridership by air passengers.	As described in detail in *Chapter 5, Ground Transportation*, there are a number of HOV services serving Logan Airport that were aimed at air passengers, including the MBTA Blue Line and Sliver Line, Logan Express, and water transportation. Massport promotes the use of these services by air passengers, primarily through the Logan Airport Employee Transportation Management Association (Logan TMA).
	Expand the Logan TMA for Airport employees.	The Logan TMA provides commuting information to all Airport employees. Massport recently provided resources to revitalize the Logan TMA and to provide greater outreach and benefits to members. In 2007, 1,632 Airport employees became part of the Logan TMA.
Minimize emissions from Construction Equipment	Incorporated Clean Air Construction Initiative (CACI) into major earthwork construction projects.	For all construction projects (i.e., centerfield taxiway) heavy construction equipment is required to be retrofitted with diesel particulate filters or diesel oxidation catalysts in accordance with CACI.
Reduce emissions from fuel vapor loss	Provide state-of-the-art fuel storage and distribution equipment.	The Fuel Storage and Distribution System is in operation.
	Implement Tank Management Program.	Refer to *Chapter 8, Water Quality/Environmental Compliance and Management*. Tank management focuses on proper maintenance.
Reduce emissions from stationary sources	Employ Reasonable Available Control Technologies (RACT) for NO_x at Central Heating/Cooling Plant.	RACT policies have been implemented.
	Use alternative fuels in snow melters.	Ultra Low Sulfur Diesel (ULSD) fuel is used in all Massport snow melting equipment.
	Incorporate green building technologies and energy use reduction strategies.	Massport participates in the State Sustainability Program. Terminal A is certified under the U.S. Green Building Council Leadership in Energy and Environmental Design® (LEED) Green Building Rating System™ and Terminal E features green building elements. In January 2008, Massport and Signature Flight Support submitted an application for certification of the new GA Facility under LEED. LEED certification was subsequently awarded in May 2008 making it the first LEED-certified GA facility in the U.S. An overview of sustainability initiatives is presented in *Chapter 1, Introduction/Executive Summary*.
Reduce aircraft emissions	Work with the FAA to study and implement airfield-improvement concepts and operational changes that may have air quality benefits.	Massport promoted such concepts through the *Logan Airside Improvements Planning Project Environmental Impact Statement,* which recommended physical and operational improvements to Logan Airport including construction of the new Runway 14-32 and centerfield taxiway, and other taxiway improvements. Runway 14-32 became operational in November 2006 and construction of the centerfield taxiway is currently underway.

In addition to measures described in Table 7-12, Massport, through its involvement in the Massachusetts Clean Cities Program, has supported the education of the general public and corporate and public fleet managers

with respect to sustainable transportation through its sponsorship of the Altwheels Transportation Festival and Altwheels Fleet Day since its inception in 2003.

Greenhouse Gases

There is now widespread consensus that GHGs contribute to climate change (also known as global warming), although there is still some uncertainty regarding the magnitude of this global impact as well as the short- and long-term remedies. There are also no specific laws or regulations in the U.S. that call for the reduction of GHGs on a large scale, although several climate change bills are currently being proposed in Congress. In all the proposed legislations, the focus has thus far remained on those entities that emit the most GHGs and have direct control over these emissions (i.e., power plants, fuel producers, cement manufacturing, etc.).

Current estimates of aviation-related GHG emission contributions to man-made totals range from 2 to 4 percent world-wide and approximately 3 percent nationwide.[8,9] However, in the U.S., there are no existing or planned regulations at the federal level specifically governing airport-related GHGs.

In October 2007, the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) published a *Final Greenhouse Gas Emissions Policy and Protocol*.[10] These guidelines require that certain projects undergoing review under MEPA (Massachusetts Environmental Policy Act) shall:

- Quantify the greenhouse gas (GHG) emissions generated by proposed projects
- Identify measures to avoid, minimize, or mitigate such emissions[11]

Massport has also voluntarily set goals and developed plans to reduce and offset GHGs associated with Logan Airport to further minimize the "carbon footprint" of Massport facilities at Logan Airport.[12] These initiatives may include (but are not necessarily limited to) the implementation of carbon-based energy-saving programs, purchasing of renewable energy credits, and other capital investments that will save fossil-fuel-generated energy in both the short- and long-terms. Scheduled for implementation in 2009, this program will initially cover GHG emission sources over which Massport has some control, including Massport offices, heating plants, parking garages and its motor vehicle fleet.

Even though the *2007 EDR* does not assess any proposed projects and is therefore not subject to the GHG policy, Massport has voluntarily prepared an emission inventory of GHG emissions directly and indirectly associated with Logan Airport. For this initial assessment, GHG emissions were quantified for the year 2007 and include aircraft operations, GSE/APU, motor vehicles, a variety of stationary sources as well as electricity usage. This work was accomplished following the EEA guidelines and uses widely-accepted emission factors that are considered appropriate for this application, including ISO[13] New England electricity-based values.

8 Intergovernmental Panel on Climate Change, The Scientific Basis, Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on climate Change, Cambridge University Press, New York, New York, 2001.
9 U.S. Governmental Accountability Office (GAO), Aviation and the Environment, NextGen and Research and Development Are Keys to Reducing Emissions and Their Impact on Health and Climate, May 6, 2008.
10 MEPA *Greenhouse Gas Emissions Policy and Protocol*, Massachusetts Executive Office of Energy and Environmental Affairs, effective October 31, 2007.
11 These GHG are comprised primarily of carbon dioxide (CO_2), methane (CH_4), nitrous oxides (N_2O), and three groups of fluorinated gases (i.e., sulfur hexafluoride [SF_6], hydrofluorocarbons [HFCs], and perfluorocarbons [PFCs]). GHG emission sources associated with airports are generally limited to CO_2, CH_4, and N_2O.
12 *Massport Announces Initiatives to Reduce Impact on Environment Authority's Electricity Usage Will Be Carbon Neutral by 2010*, Massport, April 22, 2008, website: www.massport.com/about/press_news_EarthDay08.html.
13 International Organization for Standardization.

For the purposes of this GHG emissions inventory, "direct" emissions are categorized as those that occur within the Airport boundaries. However, it must be noted that Massport does not have control over most of these emission sources (e.g., aircraft, GSE/APU, and on-site motor vehicles). By comparison, "indirect" emissions are those that occur off the Airport site (i.e., GHG emissions that result from electricity generation, emissions of offsite motor vehicles and aircraft up to the limits of the landing/take-off (LTO) cycle, or up to an altitude of 2,320 ft. Additional information on the methodology is contained in *Appendix I, Air Quality/Emissions Reductions*.

Table 7-13 presents the 2007 GHG emissions inventory for Logan Airport reported in CO_2 equivalent values.[14] As shown, aircraft represent the largest source of "direct" GHG emissions at Logan Airport, followed by GSE/APU, motor vehicles and other sources. Aircraft also represent the largest source of "indirect" emissions followed by off-site motor vehicles and electricity generation. The combined GHG emissions for which Massport has some control over (e.g., Direct - Other Sources and Indirect - Electric Generation) represents approximately 18 percent of the overall total.

Table 7-13 Estimated Greenhouse Gas Emissions Inventory (in MMT of CO_2eq) for Logan Airport[1]

Source	CO_2	N_2O	CH_4	Totals
Direct Emissions[2]				
Aircraft[3]	0.22	<0.01	<0.01	0.22
GSE/APUs	0.08	<0.01	<0.01	0.08
Motor vehicles[4]	0.03	<0.01	<0.01	0.03
Other sources[5]	0.04	<0.01	<0.01	0.04
Total Direct Emissions	0.37	<0.01	<0.01	0.37
Indirect Emissions[6]				
Aircraft[7]	0.18	<0.01	<0.01	0.18
Motor vehicles[8]	0.05	<0.01	<0.01	0.05
Electrical consumption[9]	0.09	<0.01	<0.01	0.09
Total Indirect Emissions	0.32	<0.01	<0.01	0.32
Total Emissions[10]	0.69	<0.01	<0.01	0.69
% of State Totals[11]	-	-	-	<0.1

1 MMT - million metric tons of CO_2 equivalents (1 MMT = 1.1M Short Tons). CO_2 equivalents (CO_2eq) are bases for reporting the three primary GHGs (e.g., CO_2, N_2O and CH_4) in common units. Quantities are reported as "rounded" and truncated values for ease of addition.
2 Direct emissions are those that occur in areas located within the Airport's geographic boundaries.
3 Direct aircraft emissions based engine start-up, taxi-in, taxi-out and ground-based delay emissions. .
4 Direct motor vehicle emissions based on on-site vehicle miles traveled (VMT).
5 Other sources include Central Heating and Cooling Plant, emergency generators, snow melters and live fire training facility.
6 Indirect emissions are those that occur off the Airport site.
7 Indirect aircraft emissions are based on take-off, climb-out and landing emissions which occur up to an altitude of 2,320 ft., the limits of the landing/take-off (LTO) cycle.
8 Indirect motor vehicle emissions based on off-site airport-related VMT and an average round trip distance of 60.2 miles (2003 Passenger Ground Access Survey).
9 Electrical consumption emissions occur off-airport at power generating plants.
10 Total Emissions = Direct and Indirect.
11 Percentage based on relative amount of Airport total of direct emissions to statewide total from World Resources Institute (cait.wri.org).

14 CO_2 equivalent values are based upon the Global Warming Potential values of 1 for CO_2, 23 for CH_4, and 296 for N_2O (based on a 100 year period) as presented in the Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report, *Climate Change 2001: The Scientific Basis, Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, New York City, NY. 2001.

Massport will update the GHG Emissions Inventory for Logan Airport annually. The Transportation Research Board is presently developing unified methods for preparing airport-related GHG emission inventories.[15] These new guidelines are expected to be published in late 2008 and may have an effect on how future inventories for Logan Airport and other U.S. airports are computed.

Updates on Other Air Quality Initiatives

Massachusetts Department of Public Health Study

In 2004, the Massachusetts Legislature appropriated funds for the Department of Public Health (DPH) to undertake an assessment of potential health impacts of Logan Airport in the East Boston section of the city and any other communities located within a five-mile radius of the Airport. With the focus on noise and air quality, this study is currently underway and consists of an epidemiological survey combined with computer modeling of noise levels and air pollution concentrations. Massport has cooperated in this effort by providing DPH with Airport operational data in support of the assessment. DPH's anticipates completing this report in late 2008.

Massport Air Quality Monitoring Study

Massport is also undertaking a $1.6 million air quality monitoring study in and around Logan Airport in compliance with its MEPA Section 61 findings for the centerfield taxiway component of the Logan Airside Improvements Project (LAIP). The study will gather air quality data in the communities around Logan Airport before and after the centerfield taxiway is operational, with an emphasis on ambient (i.e., "outdoor") levels of particulate matter and hazardous air pollutants (HAPs). Massport worked cooperatively with the MA DEP and MDPH to develop the monitoring study. This monitoring study is independent of, and in addition to, the long-term Measured NO_2 Concentrations Program discussed earlier in this chapter.

Air monitoring commenced on schedule in September 2007 at ten different stations located on and off the Airport, comprises both "real-time" and "time-integrated" monitoring methods, and includes measurement of fine particulates, VOC, carbonyls, black carbon, and polynuclear aromatic hydrocarbons (PAHs). Massport reports to MA DEP and MDPH on the results of the air monitoring.

The first year of the two-year study will collect air monitoring data until September 2008 and will then recommence for another 12-month period in about two years after operation of the centerfield taxiway. Massport will complete a report on the first phase of the monitoring study in 2009.

Further details on the Massport Air Quality Monitoring Study can be found on Massport's website at www.massport.com/logan/airpo_air.html.

Logan Airport Energy Planning

In an effort to enhance the energy profile and reduce air emissions associated with the Central Utility Plant Massport commissioned a study to help improve the operational, economic and environmental benefits

15 Transportation Research Board, Airport Cooperative Research Panel, ACRP 02-06, Draft Guidebook on Preparing Airport Greenhouse Gas (GHG) Emissions Inventories (in production) see www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=1584 for more information.

through "cogeneration".[16] If implemented, this plan is expected to reduce energy consumption Airport-wide while also reducing emissions of the EPA "criteria" pollutants (i.e., CO, NO_x, etc.) and GHGs.

Southwest Service Area Redevelopment Program

The proposed Southwest Service Area (SWSA) Redevelopment Program comprises a Consolidated Rental Car Facility (ConRAC) and commercial parking. The ConRAC would consolidate on-airport rental car operations and facilities into one integrated facility in order to better serve both the tenants and the traveling public, reduce ground transportation and air quality impacts on-airport and in the surrounding neighborhoods, and to reduce associated off-airport impacts. The new consolidated rental car (ConRAC) facility would allow for the reduction of shuttle bus trips, VMT and the associated emissions through the implementation of the consolidated shuttle bus fleet. This consolidated shuttle bus fleet would use clean fuels, further reducing emissions compared to the existing bus fleet. Other air quality benefits of the SWSA Redevelopment Program would include the reduction of curb-side congestion at the main terminal complex. *Chapter 5, Ground Transportation* provides additional detail on the environmental benefits of the SWSA Redevelopment Program.

Engagement in Aviation-Related Environmental Issues
Massport maintains memberships and active participation in a number of organizations involved in addressing aviation-related environmental issues, including air quality. These include serving on environmental committees for the TRB, American Association of Airport Executives (AAAE), Airports Council International (ACI), and Women's Transportation Seminar (WTS) and symposia.

Statewide National and International Initiatives

Advancements on the national and international levels to decrease Airport-related air emissions focused primarily on three initiatives in 2007: the advanced quantification of PM and HAP emissions from aircraft engines, the continued phasing-in of AFV, and the implementation of greenhouse gas (GHG) emissions reduction strategies. These initiatives are briefly described below.

- **Particulate Matter and Hazardous Air Pollutant Research—** Conducted by the FAA/National Aeronautics and Space Administration (NASA)/EPA and others, research continues to better characterize PM and HAPs emissions from aircraft engines and to assess their potential health effects.[17] Similarly, air quality monitoring campaigns at other airports are also underway (or planned) at various locations to advance what is known about ambient ("outdoor") levels of air pollutants in the vicinities of the nation's airports.[18] In addition to conducting its own air monitoring programs (see updates on the Measured NO^2 Concentrations Report and Massport Air Quality Monitoring Study, above) Massport continues to closely track these issues through its involvement in aviation industry organizations such as ACI and AAAE.
- **Alternative Fuel Vehicle Conversions—** Airlines and other GSE users are continually replacing their older fossil-fueled vehicles and equipment with a more fuel-efficient, low- and non-emitting (e.g., electric) technologies. Airport-fleet vehicles are also being converted to alternative fuels (e.g., propane). In response, GSE and automobile manufacturers are offering a wider selection of AFVs, many of which are designed specifically for Airport use.

16 *Logan International Airport Energy Strategic Plan*, Final Report, prepared for Massport, prepared by Source One, February 2008.
17 Aircraft Particle Emissions eXperiment (APEX), www.nasa.gov/centers/glenn/aeronautics/APEX.html.
18 These air quality monitoring programs at other airports include T.F. Green Airport (Providence, R.I.); Teterboro Airport (N.J.); and Los Angeles International, Van Nuys and Santa Monica Airports in CA.

- **Participation in Climate Action Plan—**Massport was one of 15 state agencies and authorities that participated in the development of the Climate Protection Plan: the Commonwealth's initial step towards reducing GHG. Massport is participating on two of the Plan's teams: Transportation System Planning and Transportation Technologies and Operations, with a focus in GHG emission reductions associated with Airport operations. Reduction strategies that are already in place include the following:
  - Include energy use and GHG emissions as criteria in transportation decisions
  - Maintain and update public transit systems
  - Expand programs to promote efficient travel
  - Seek opportunities to reduce emissions at Logan Airport
  - Improve aircraft movement efficiency
  - Promote the use of cleaner vehicles and fuels in public transit fleets
  - Continue to promote the use of clean diesel equipment on publically-funded construction projects
  - Eliminate unnecessary idling of buses
  - Advocate for aircraft efficiency at regional and national levels

Massport will continue to monitor these initiatives and will report on their progress in the *2008 EDR*.

8

Water Quality/ Environmental Compliance and Management

Introduction

Massport's approach to environmental management and compliance is a key component of its commitment to sustainability at Logan Airport (refer to *Chapter 1, Introduction/Executive Summary* for details). Through monitoring and documentation, environmental performance is assessed, allowing policies and programs to be developed, implemented, and evaluated.

Massport's primary water quality goal is to prevent or minimize pollutant discharges, thus limiting adverse water quality impacts associated with airport activities. Massport employs several protection programs to promote awareness of Massport and tenant activities that may impact surface and groundwater quality, including implementing best management practices (BMPs) for pollution prevention by Massport and its tenants. In addition, Massport voluntarily participates in the State's Leading by Example Program, continuing its commitment to operate Logan Airport in an environmentally-sound manner. Massport complies with the Massachusetts Contingency Plan (MCP) by monitoring fuel spills and tracks the status of spill response actions. The MCP, codified as 310 Code of Massachusetts Regulations (CMR) 40, lays out a set of regulations that govern the reporting, assessment, and cleanup of spills of oil and hazardous materials in Massachusetts. Massport also implements a Tank Management Program, which includes a tank monitoring upgrade and replacement program. Information on Massport's Logan Airport Stormwater Pollution Prevention Plan (SWPPP), Spill Prevention Control and Countermeasure plan (SPCC), and the MCP are further detailed in this chapter.

The federal Clean Water Act requires permits for pollutant discharges into United States (U.S.) waters from a point source and for stormwater discharges associated with industrial activities. Massport holds permits under the U.S. Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System (NPDES) Program.

Massport is responsible for ensuring compliance with applicable state and federal environmental laws and regulations. It also promotes appropriate environmental practices through pollution prevention and remediation measures. Massport also works closely with tenants in an effort to improve tenant compliance. Massport's environmental programs pertaining to water quality and environmental compliance and management include:

- Stormwater management
- Water quality management
- Massachusetts Contingency Plan compliance
- Storage tank compliance
- Compliance auditing and inspections
- Environmental Management System (EMS) implementation
- Clean State Initiative and Leading by Example Program participation

Key Findings

In 2007:

- Of the 108 oil and hazardous material spills, seven (6 percent) were considered reportable (i.e., over 10 gallons) under the applicable environmental regulations. Jet fuel spills accounted for 66 (61 percent) of the total spills, with four of the jet fuel spills exceeding 10 gallons. The remaining 42 spills (39 percent) involved gasoline, hydraulic oil, diesel fuel, and other substances, including three reportable spills.
- Three of 404 outfall samples exceeded the regulatory limits of the NPDES permit for the Airport's permitted outfalls. The Maverick Street Outfall had two samples exceed the 100 milligrams per liter (mg/L) daily maximum limit for Total Suspended Solids (TSS) and the West Outfall had one sample exceed this limit. This is an improvement compared to 2004 and 2006 when four samples exceeded the regulatory limits, and 2005 when eight samples exceeded the regulatory limits.
- In accordance with the MCP, Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. Massport was working towards achieving regulatory closure of six remaining MCP sites.

Stormwater Management

On July 31, 2007, the EPA and Massachusetts Department of Environmental Protection (MA DEP) issued a new NPDES permit for Logan Airport's stormwater outfalls (NPDES Permit MA0000787). The new permit replaces the previous NPDES Permit MA0000787, and became effective on September 29, 2007. The new NPDES permit is on the EPA's website at www.epa.gov/NE/npdes/logan/pdfs/finalma0000787permit.pdf. There is a separate NPDES permit for the Fire Training Facility (NPDES Permit MA0032751). The following sections describe the requirements of the two permits, and Massport's compliance with these requirements.

Stormwater Outfall NPDES Permit Requirements and Compliance

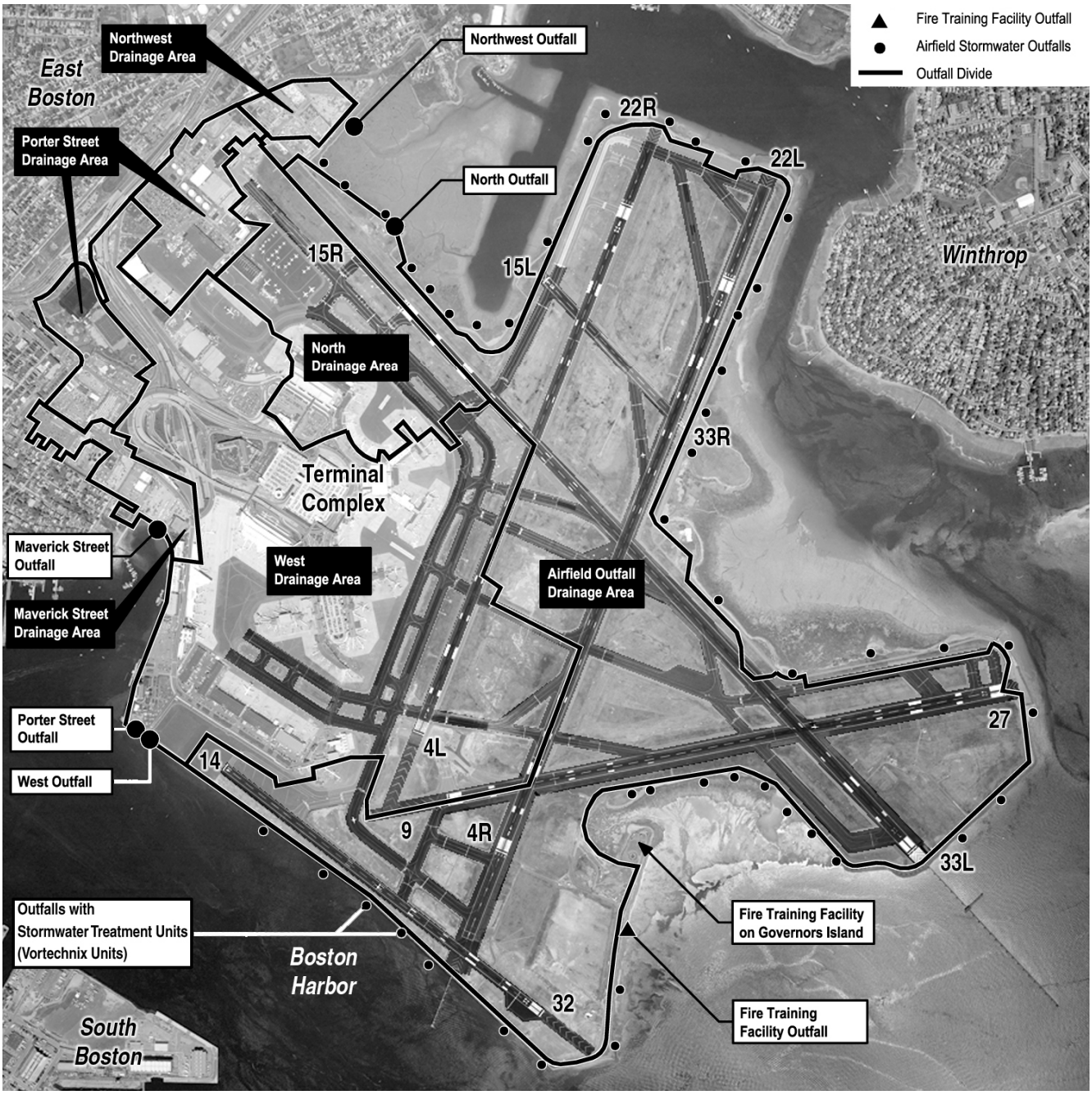
The new NPDES permit MA0000787 regulates stormwater discharges from the North, West, Northwest, Porter Street, and Maverick Street Outfalls, and all of the airfield outfalls. The previous NPDES permit regulated stormwater discharges only from the North, West, Porter Street, and Maverick Street Outfalls. The areas drained by the outfalls are the North Drainage Area (152 acres); West Drainage Area (557 acres); Northwest Drainage Area (23 acres); Porter Street Drainage Area (130 acres); Maverick Street Drainage Area (34 acres); and the Airfield Outfall Drainage Areas (A1 through A44) which drain the remainder of the airfield including runways, taxiways, and the perimeter roadway (910 acres). The North and West Drainage Areas also drain a portion of the airfield. These drainage areas are shown in Figure 8-1 and further detailed in Table 8-1. The North and West Outfalls have end-of-pipe pollution control facilities for the removal of debris and floating oil and grease prior to discharge into Boston Harbor. The Porter Street Outfall does not have end-of-pipe pollution control facilities because it is a combined sewer overflow for the Boston Water and Sewer Commission. There are two stormwater treatment units (Vortechnix units) at outfalls A41 and A42 which remove suspended solids, oil and grease, and debris from stormwater prior to discharge into Boston Harbor.

Table 8-1 Stormwater Outfalls Subject to NPDES Permit Requirements

Outfall Name and Number	Drainage Area (Acres)	Boston Harbor Discharge Location	Major Land Uses
North (001)	152	Wood Island Bay	Terminal E, apron, taxiway, cargo areas, fuel farms, runways
West (002)	557	Bird Island Flats	Taxiways, terminal areas, aprons, cargo areas, runways
Porter Street (003)	130	Bird Island Flats	Hangars, vehicle maintenance facilities, cargo areas, car rental facilities, roadways
Maverick Street (004)	34	Jeffries Cove	Car rental facilities, taxi/bus/limo pools, parking areas, flight kitchens
Northwest (005)	23	Wood Island Bay	Flight kitchen, vacant area being used for construction lay down
Airfield (A1 through A44)[1]	910	Perimeter of Airfield	Runways, taxiways, perimeter roadway

1 In accordance with the requirements of the new NPDES permit, Massport developed an Airfield Stormwater Outfall Sampling Plan by March 27, 2008. The Plan requires quarterly wet weather sampling at a minimum of seven of the airfield outfalls (A1 through A44) in order to obtain representative samples of the quality of stormwater runoff from the airfield.

Figure 8-1 Logan Airport Outfalls



The former NPDES permit which was in effect during the first three quarters of 2007 required one sample to be taken each month at the North, West, Porter Street, and Maverick Street Outfalls during dry weather, one during wet weather, and one within 24 hours after a rainfall event. These samples were tested for pH, oil and grease, and settleable solids. The new NPDES permit requires grab samples to be taken monthly from the North, West, Porter Street, and Maverick Street Outfalls. Samples are tested for pH, oil and grease, TSS, benzene, surfactants, fecal coliform, and enterococcus during both wet and dry weather. Grab samples were also taken quarterly from these four outfalls during wet weather to test for eight different polynuclear aromatic hydrocarbons (PAHs). Additional sampling requirements of the new NPDES permit include sampling for deicing compounds twice during the deicing season (October through April) at the North, West, Porter Street, and airfield (a minimum of seven) outfalls, collecting one grab sample per month of accumulated water in the storage tank and fuel loading areas prior to discharge to the North Outfall, and collecting one grab sample per quarter during wet weather from the Northwest Outfall and from a minimum of seven of the airfield outfalls that discharge runoff from the runways and perimeter roadway. *Appendix J, Water Quality/ Environmental Compliance and Management* contains additional information on the sampling requirements of the new NPDES permit.

Beginning in 2006, Massport conducted an inspection of the sanitary sewer and stormwater drainage system across Logan Airport in order to document the condition of the systems and identify potential impacts from the sewer to the stormwater drainage system. Such impacts can result from leaks in the sanitary sewer or from direct, inadvertent, illegal connections to the stormwater drainage system. The following work was completed in 2006 and 2007:

- Updated the mapping for, cleaned, and inspected 1,570 sanitary sewer and stormwater drainage structures.
- Cleaned and inspected via an in-pipe TV camera, approximately 28,000 linear feet of sanitary sewer.
- Dye-tested suspect portions of the sanitary sewer, and the sewer service lines at several buildings.

The comprehensive sewer inspection identified deficiencies including:

- An inadvertent, illegal connection to the stormwater drainage system at Terminal B.
- A fully collapsed sewer in front of Terminal C and a collapsed sewer service line at Cargo Building 63.
- Several surcharged sewer manholes indicating clogged pipes (approximately 45 tons of sediment and debris were removed from the sewers and storm drains).
- Partially collapsed sewers along the North Airport Access Road and Prescott Street.

The above deficiencies were corrected, with the exception of the partially collapsed sewers that exist along the North Airport Access Road and Prescott Street which are being addressed by the Boston Water & Sewer Commission. The new NPDES permit requires Massport to develop an Airfield Stormwater Outfall Sampling Plan by March 27, 2008. The airfield outfall monitoring results will be reported in the *2008 Environmental Data Report (2008 EDR)*. Sampling for deicing compounds was conducted in early 2008 and the results will be reported in the *2008 EDR*.

In 2007, the Maverick Street Outfall had two samples exceed the 100 milligrams per liter (mg/L) daily maximum limit for TSS and the West Outfall had one sample exceed this limit. This is an improvement compared to 2004 and 2006 when four samples exceeded the regulatory limits, and 2005 when eight samples

exceeded the regulatory limits. Stormwater discharged from the storage tank and fuel loading areas to the North Outfall was in compliance with the discharge limitations specified in the NPDES permit. The 2007 water quality monitoring results for discharge from the outfalls is provided in *Appendix J, Water Quality/ Environmental Compliance and Management,* along with the history of water quality monitoring results that dates back to 1993. Due to the large size of the drainage areas and relatively low concentration of pollutants, it is typically not possible to trace exceedances to specific events. Where a known event, such as a spill, is reported, Massport routinely checks the drainage system for possible signs of a spill and takes corrective actions if necessary.

The NPDES water quality monitoring results are posted on Massport's website (www.massport.com). In accordance with the new NPDES permit, Massport provides copies of the monitoring results to the EPA, MADEP, Boston Public Health Commission, City of Boston Environmental Department, and Winthrop Town Manager's office. Massport is required to notify these agencies of any instances of noncompliance with the discharge limitations set out in the NPDES permit which may endanger human health or the environment.

Fire Training Facility NPDES Permit Requirements and Compliance

NPDES Permit No. MA0032751 regulates treated wastewater from the Fire Training Facility on Governors Island (Figure 8-1). The treated wastewater from fire training exercises is stored, treated by separation and a carbon filter to remove fuel contaminants, and is normally reused onsite. If no storage is available, treated wastewater is tested prior to discharge to the storm sewer to ensure compliance with the NPDES permit. Discharge monitoring reports are submitted monthly to the EPA. In 2007, Massport beneficially reused all of the wastewater at the Fire Training Facility.

Fuel Use and Spills

Management of fueling operations at Logan Airport is designed to minimize impacts on water quality through the use of reliable storage, secondary containment, and effective spill clean-up procedures. Massport's jet fuel storage and distribution infrastructure, installed in 2000 and 2001, includes a state-of-the-art, zoned leak-detection system for underground fuel piping, which identifies volumetric changes of product in the pipe at operating pressure and zero pressure. The system combined the storage facility with a hydrant fuel system that reduced the need for trucks and dispensing. The former fuel farms were removed in 2000.

This fuel storage and distribution system was designed to ensure, to the extent feasible, for the reliable detection of leaks. The aboveground jet fuel storage facility and distribution system are operated by a single party, BOSFUEL, offering unified and improved management and coordination. Considerable organization effort was put in place to minimize potential fuel spills and maximize water quality protection for the storage and distribution facilities. Cathodic protection, leak detection, secondary containment, and tank overfill protection methods such as alarms, inventory gauging sensors in the tanks, and emergency fuel shut-off systems have been installed. The operation and maintenance of these controls have been included in the Operation and Maintenance Manual used by BOSFUEL to operate and maintain the facility. Built-in environmental controls, unified operations, and the ongoing contingency planning provide heightened environmental protection and more efficient fuel handling operations than the previous system. In 2007, in coordination with Massport, BOSFUEL prepared construction documents for replacing a portion of the fuel distribution system. Construction is scheduled to commence in 2008.

The Massport Fire-Rescue Department keeps logs of all spills at Logan Airport. State environmental regulations require that oil spills of greater than 10 gallons in volume be reported to MA DEP. Spills that enter storm drains must also be reported. Massport keeps records of all spills, including those less than the reporting threshold. In 2007, of the 108 oil and hazardous material spills reported to the Logan Airport Fire-Rescue Department, seven (6 percent) were considered reportable (Table 8-2). Jet fuel spills accounted for 66 (61 percent) of the total spills, with four of the jet fuel spills exceeding 10 gallons. The remaining 42 spills (39 percent) involved gasoline, hydraulic oil, diesel fuel, and other substances, including three reportable spills. A summary of Logan Airport jet fuel usage and spill records from 1990 to 2007, and greater detail pertaining to type and quantity of the spills can be found in *Appendix J, Water Quality/Environmental Compliance and Management*.

Table 8-2 Logan Airport Oil and Hazardous Material Spills[1] and Jet Fuel Handling

Year	Total Number of all Spills	Total Number of all Spills >10 gallons	Total Volume of all Spills (Gallons)	Estimated Volume of Jet Fuel Handled (Gallons)	Total Volume of Jet Fuel Spilled (Gallons)
2004	126	18	894	373,996,141	574
2005	97	15	2,319	368,645,932	585
2006	92	11	752	364,450,864	644
2007	108	7	604	367,585,187	361

Source: Massport Fire-Rescue Department.
Notes:
1 Materials include: jet fuel, hydraulic oil, diesel fuel, gasoline, and other materials such as glycol and paint.
Oil and hazardous material spills and jet fuel handling data from1990 through 2007 is presented in *Appendix J, Water Quality/Environmental Compliance and Management*.

Tank Management Program

Massport's Tank Management Program includes a tank upgrade and replacement program, which by the end of 1998 had brought all Massport-owned tanks into regulatory compliance, meeting federal and state upgrade deadlines. In 1993, Massport began a six-phase Storage Tank Modifications Construction program. In 2005, Massport completed Phases I through VI of the Storage Tank Modifications Construction work, upgrading several existing tanks. As a BMP, Massport will continue to upgrade older tanks and to monitor tank systems.

Massport is also implementing a successful tank release prevention strategy, which includes:

- A program of monthly inspections and minor repairs of all Massport-owned tanks, related piping, and tank monitoring systems.
- Annual Stage II Vapor Recovery testing of Massport's underground storage tank and piping systems. Stage II Vapor Recovery Systems collect gasoline vapors from vehicles' fuel tanks when customers dispense gasoline products into their vehicles at gasoline dispensing facilities. The Stage II system uses special nozzles and coaxial hoses at each gasoline pump to capture vapors from vehicle fuel tanks during the refueling process and re-route them to the station's storage tank(s).
- Annual inspections of all of Massport's aboveground storage tanks greater than 10,000 gallons in volume.

- Review of all proposed tenant tank upgrades, installations, and tank removals (under the Tenant Alteration Application process) to ensure compliance with applicable state and federal regulations and with Massport policy.
- Ongoing upgrade and maintenance of a Geographic Information System (GIS) database that contains information on all storage tanks located on Massport property. For each tank, the database tracks location, permit status, compliance status with applicable tank regulations, and tank and monitoring system equipment summaries.

Massport also provides tenants with revised storage tank regulatory requirements and assists with tank permitting processes.

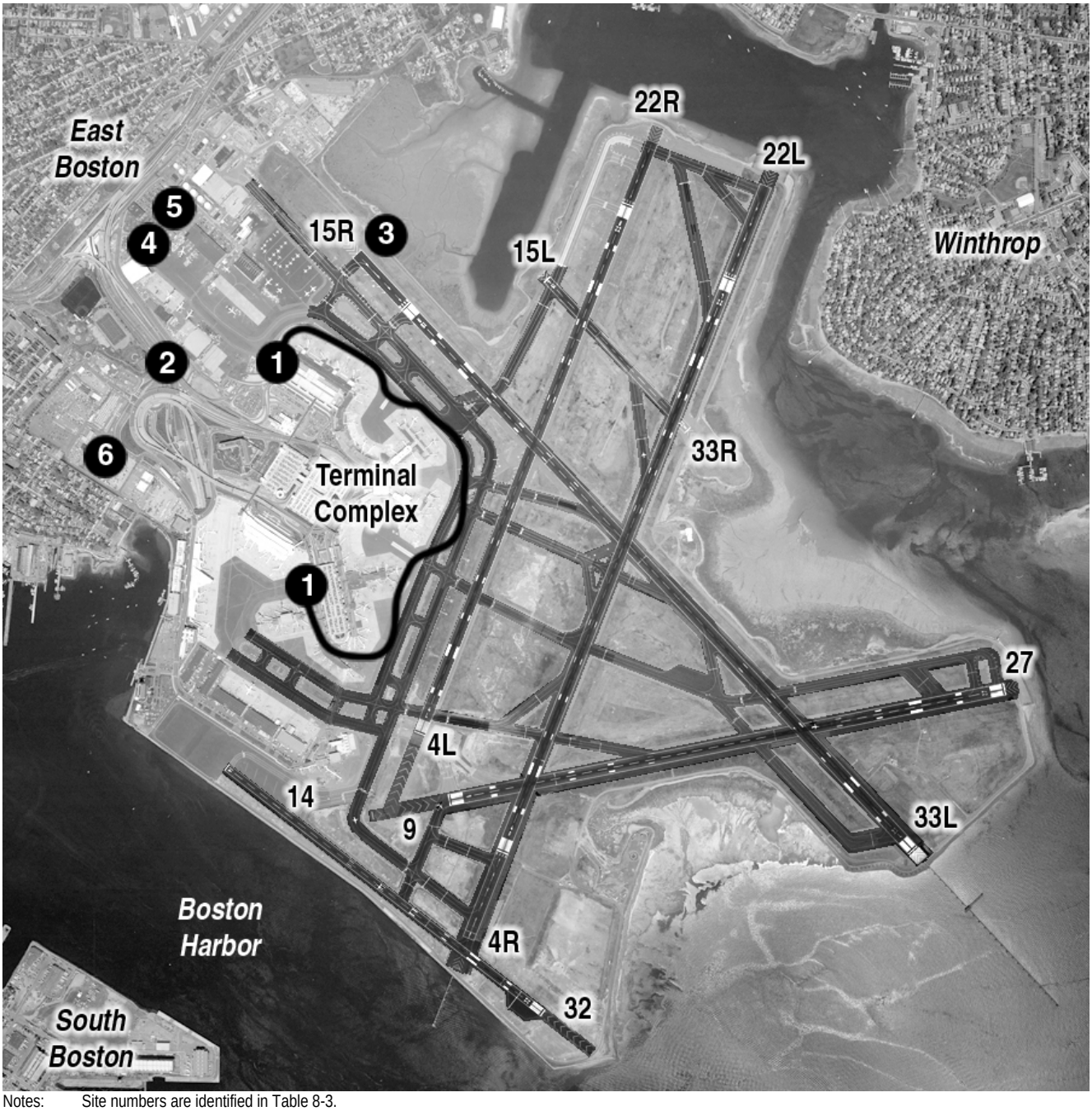
Site Assessment and Remediation

The MCP (310 CMR 40), which is administered by the MA DEP, pertains to releases of oil or hazardous materials into the environment. The MCP prescribes the site cleanup process based on the nature and extent of the release's contamination. The MCP defines the roles for those parties affected by and potentially responsible for the release and establishes the release reporting program and submission deadlines for tracking events from initial release to regulatory closure.

In accordance with the MCP, Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. There are a number of phases for the investigation of contaminated sites. Phase I involves initial site investigations for the presence of contamination and Phase II assessments are more comprehensive site investigations. Phase III identifies, evaluates, and selects remediation actions and Phase IV involves the implementation of selected remedial actions. Phase V involves the operation, maintenance and/or monitoring of the remediation program. Massport led the performance of a variety of response actions, including remediation at sites where Massport is the responsible party, where there are multiple responsible parties, and where no responsible party has been identified.

Table 8-3 describes Massport's progress in 2007 in achieving regulatory closure of the MCP sites identified in Figure 8-2.

Figure 8-2 Massachusetts Contingency Plan Sites



Notes: Site numbers are identified in Table 8-3.

Table 8-3 MCP Activities Status of Massport Sites at Logan Airport

Location (Release Tracking Number) and MA DEP Reporting Status	Action/Status
1. Fuel Distribution System (3-1287)	
Phase II Report filed in April 1997	Indicated fuel floating on the groundwater table in 10 discrete locations in the terminal areas; cleanup required to achieve regulatory closure.
Phase III Report filed in April 1997	Reported product recovery as the preferred cleanup alternative; none of the areas to be cleaned up by a responsible party (i.e., a tenant responsible for the contamination). Cleanup was anticipated to span a minimum of three years.
Phase IV Remedy Implementation Plan filed in March 1998	The plan described seven discrete locations of separate phase hydrocarbons (jet fuel floating on the groundwater) to be remediated at Terminals C and E as well as three discrete areas at Terminal B to be remediated by tenants who were responsible for the historic release. The remediation strategies that Massport undertook at the seven areas differed depending on the product thickness. Strategies included trench-based product recovery, multi-phase extraction, excavation and dewatering during construction, and passive remediation.
Phase V Inspection and Monitoring Status Reports filed in September 1998, March 1999, and October 1999	The Status Reports documented remedial actions at seven areas including passive recovery of separate phase hydrocarbons (SPH) at Areas 1, 6, and 7, and pumping to recover SPH at Area 3. Interim passive recovery was also implemented at Areas 2 and 4, pending the evaluation of active recovery systems. Remedial objective of less than1/2 inch of product has been met at Areas 1, 2, 5, 6, and 7, but monitoring continues. MCP closure will be achieved at these areas by applying an AUL.
Tier II Extension Request submitted in March 2000	Site Closure was not achieved by the March 2000 deadline. A Tier II Extension Request was submitted, providing a plan for continued SPH recovery and monitoring until the remedial objective has been accomplished.
Response Action Outcome (RAO) Submitted March 2001	Under the Class C RAO, monitoring continues at this location along the fuel line for the presence of SPH.
Tier II Extension Request Submitted in July 2002	The Tier II Extension Request and RAM Plan were submitted prior to construction of the Baggage Screening Project in the area of the Fuel Distribution System.
2003	Massport submitted status reports detailing fuel recovery efforts along the distribution system.
2004	Massport submitted status reports to MA DEP detailing fuel recovery efforts along the distribution system in March and September 2004.
2005	Inspection and Monitoring Status Reports were submitted to the MA DEP in March 2005 and March 2006 detailing monitoring and product recovery efforts along the fuel distribution system during the period between September 2004 and September 2005.
2006	An Inspection and Monitoring Status Report was submitted to the MA DEP detailing monitoring and product recovery efforts along the Fuel Distribution System (FDS) between March and September 2006. Massport continues to review data for tightness testing of the fuel line, and completed leak testing of fuel hydrants pits adjacent to Terminal B and Terminal C. Massport continues to meet with the operator of the FDS, BOSFUEL, to assess conditions along the FDS at Terminal B and Terminal C, referred to as the Retained Facilities portion of the FDS, and to coordinate the replacement of the Retained Facilities, which is scheduled for 2008.
2007 Update	*Inspection and Monitoring Status Reports were submitted to the MA DEP detailing monitoring and product recovery efforts along the FDS between September 2006 and September 2007. A Periodic Evaluation Report was submitted in January 2008 which indicated that a Condition of No Substantial Hazard exists at the FDS and a permanent solution is not currently feasible. Massport is coordinating with BOSFUEL who are preparing construction documents for replacing a portion of the FDS. Construction will be conducted under a RAM Plan and is scheduled to commence in 2008.*

Table 8-3 MCP Activities Status of Massport Sites at Logan Airport (Continued)

Location (Release Tracking Number) and MA DEP Reporting Status	Action/Status
2. Citgo Service Station (3-2616)	
Phase II Report filed in April 1997	Indicated soil and groundwater contamination exists; cleanup required to achieve regulatory closure.
Phase III Report filed in April 1997	Identified various alternatives that could be implemented to achieve closure. Underground storage tanks were removed by the Central Artery/Tunnel (CA/T) Project during building demolition. Additional soil was removed during CA/T Project construction.
2002	Massport is preparing to close out this site following removal of petroleum-contaminated soil during CA/T project construction.
2003 and 2004	The CA/T Project has collected subsurface data necessary to close this site. Massport and the CA/T Project are evaluating the data and preparing the documentation required to close the site.
2005	The CA/T Project is preparing a final closure report for work that included excavating contaminated material in the area of the former Citgo Service Station.
2006	The CA/T Project completed a final closure report covering the former Citgo Service Station area.
2007 Update	*Based on the assessment provided in the final closure report, Massport submitted a Class A-2 RAO for this site in April 2007. No further action is required.*
3. North Outfall (3-4837)	
Phase II and Phase III Reports filed in March 1997	Indicated petroleum contamination present at the site is likely the result of decades of airport operation; risk assessment reported no significant risk to human health, or to the aquatic and avian community.
RAO submitted in March 1998	Class C RAO using a Temporary Solution (periodic site monitoring and assessment); remediation steps included (not limited to) installation of a new fuel distribution system and decommissioning of certain fuel lines, and natural biodegradation processes; goal is to have petroleum contamination reduced to an area less than 1,000 square feet. Installation of the new fuel distribution system and decommissioning of sections of the old system are completed. Massport has initiated site evaluation to document the reduction of petroleum contamination following the decommissioning of the North Fuel Farm and fuel distribution system.
Post RAO C evaluation report submitted in December 2002	Massport has eliminated substantial hazards at this site and has submitted a Class C RAO statement. In accordance with applicable regulations, Massport will conduct a periodic evaluation at five year intervals until a Permanent Solution has been achieved. The next periodic evaluation is scheduled for 2007.
2004	Evaluation report indicated that a "Condition of No Significant Risk" has not been achieved at this site. Massport will conduct another assessment in 2007.
2005	No change in status for 2005.
2006	Massport prepared the five-year review of the Class C RAO for this site, which was due in December, 2007.
2007 Update	*Massport completed its five-year review of the Class C RAO and transmitted it to MA DEP in December 2007. It was determined that a "Condition of No Significant Risk" has not been achieved at this site at this time. The next five-year re-evaluation will be conducted in 2012.*
4. Former Robie Park (3-10027)	
2005	A Phase I was completed in 2005 with an RAO retraction. The RAO had been completed by the former property owner.
2006	No change in status for 2006.
2007 Update	*No change in status for 2007.*

Table 8-3 MCP Activities Status of Massport Sites at Logan Airport (Continued)

5. Former Robie Property (3-23493)	
2005	A Phase I was completed in 2005.
2006	No change in status for 2006.
2007 Update	*No change in status for 2007.*
6. Tomahawk Drive (3-27068)	
2007 Update	*Release notification form submitted in August 2007.*

Notes: This list includes Massport MCP sites only. Additional sites are the responsibility of Logan Airport tenants.
Italicized text denotes progress in 2007. Refer to Figure 8-2 for location of MCP sites.
Partial RAOs were submitted in May 2004 for Areas 1 (Terminal E, Gate 8B), Area 2 (Terminal E, Gates 3 and 4), and Area 6 (Terminal C, Gates 26 and 28). No further response actions in these areas are required.

AUL	Activity and Use Limitation	Phase I	Initial Site Investigation
MCP	Massachusetts Contingency Plan	Phase II	Comprehensive Site Assessment
RAM	Release Abatement Measure	Phase III	Identification, Evaluation, and Selection of Comprehensive Remedial Actions
RAO	Response Action Outcome	Phase IV	Implementation of Selected Remediation Action
SPH	Separate Phase Hydrocarbon	Phase V	Operation, Maintenance and/or Monitoring
FDS	Fuel Distribution System		

Environmental Compliance and Management

Massport works to minimize environmental impacts at Logan Airport through ongoing programs and new initiatives. Massport's overall environmental compliance and management efforts address the following goals:

- Protect water quality Airport-wide
- Protect groundwater resources
- Protect surface water resources (Boston Harbor)
- Minimize air quality impacts
- Protect resources during construction
- Mitigate construction impacts
- Reduce occurrences of fuel leaks and spills
- Preserve coastal resources adjacent to the Airport

The progress report for environmental compliance and management in Table 8-4 summarizes Massport's mechanisms for implementing these goals and details where changes to these efforts occurred in 2007.

Table 8-4 Progress Report for Environmental Compliance and Management

Plan Elements	Progress Report for 2007
Environmental Compliance Inspections	In 2007, Massport performed tenant inspections of all of the 27 NPDES co-permittees (Logan Airport tenants) and made recommendations suggesting how to rectify issues identified during the inspections.
Environmental Management System (EMS)	In 2006, Massport began developing an EMS for Logan Airport, specifically for facilities where fleet and field maintenance activities are conducted. ISO 14001certification was obtained for Facilities II (vehicle maintenance, landscaping, and snow removal) in December 2006. Massport will likely obtain ISO 14001 certification for Facilities I (Central Heating and Cooling Plant) and III (Electrical and Structural) in 2008.
Tenant Technical Assistance	Massport continued publication of *EnviroNews*, a quarterly newsletter that informs tenants of regulatory calendar milestones, permitting requirements, pollution prevention, BMPs; recommends use of sustainable materials; and provides information on Massport and other environmental requirements. Copies of the 2007 newsletters are provided in *Appendix J, Water Quality/Environmental Compliance and Management*.
Stormwater Pollution Prevention Plan (SWPPP)	In accordance with the requirements of the new NPDES permit for Logan Airport that was issued on July 31, 2007, Massport and all 27 co-permittees and tenants began preparation of updated SWPPPs. Massport completed their SWPPP in December of 2007. Tenant SWPPPs were completed in March 2008. Massport's SWPPP addresses stormwater pollutants in general, and also addresses deicing and anti-icing chemical, potential bacteria, fuel and oil, and other sources of stormwater pollutants. BMPs are included in the SWPPP. In accordance the other requirements of the new NPDES permit, Massport is required to conduct training for personnel responsible for implementing activities identified in the SWPPP.
Construction Plans	Massport requires construction BMPs to be included in contracts. Massport provides a generic SWPPP to contractors for all Logan Airport construction projects, which provides guidance in preparing project-specific SWPPPs and BMPs to control sedimentation and other pollutants from construction projects. Massport monitors construction projects at Logan Airport for compliance with project SWPPPs and regulatory requirements. For all construction projects, Massport requires the use of ultra low-sulfur diesel fuel in construction equipment, recycling of all construction waste to the maximum extent possible, and construction equipment retrofits with pollution control devices such as diesel oxidation catalysts and/or particulate filters.
Spill Prevention Countermeasure and Control (SPCC)	Tenants meeting certain thresholds are required to prepare their own SPCC plans for their facilities. Massport checks for SPCC plans during its environmental compliance inspections. Additionally, tenants receive information on BMPs, which focus on spill management and prevention.
Air Emissions Reduction	All Massport diesel vehicles are now fueled with ultra low-sulfur diesel. In 2007 Massport installed parking heaters in two vehicles on a trial basis. The parking heaters operate independently of a vehicle's engine and Massport conducted the trial in order to measure the fuel savings/air emissions reductions associated with reduced vehicle idling time during snow operations. Massport is evaluating the results of the trial to determine if additional parking heaters should be procured and installed in more vehicles.

Clean State Initiative and Leading by Example Program

In 2007, Massport continued its voluntary involvement with the Clean State Initiative which was established under Executive Order 350. Massport worked to identify, evaluate, and correct matters of environmental noncompliance. In 2007, there were two outstanding environmental matters under the Clean State Initiative that Massport was working to resolve. The first relates to replumbing of stormwater/sanitary piping in both the Central and Terminal B garages. Work in the Central Garage was completed in 2007. Massport anticipates that work in the Terminal B garage will be completed in 2009. The second matter relates to a MCP site (Citgo Service Station) that was impacted by the CA/T Project. Massport submitted a Class A-2 Response Action Outcome (RAO) for this site in April 2007 and no further action is required.

On April 18, 2007, the Governor signed Executive Order 484, establishing the Leading by Example – Clean Energy and Efficient Buildings Program (known as the Leading by Example Program). Executive Order 484 supersedes Executive Order 438 which established the former State Sustainability Program. The Leading by Example Program was created to help state agencies minimize the environmental impacts of their operations and activities and to promote innovative solutions to critical environmental problems. The Executive Order sets aggressive targets for state facilities in greenhouse gas emission reductions, energy conservation and efficiency, renewable energy, green buildings, and water conservation. Massport voluntarily participates in this program.

9 Project Mitigation Tracking

Introduction

This *2007 Environmental Data Report* (*2007 EDR*) provides a status report on Massport's mitigation commitments under the Massachusetts Environmental Policy Act (MEPA) for various airport projects. Each of these projects completed the state and federal environmental review processes and adopted a mitigation plan (Section 61 Findings).[1] Massport has in place a tracking program, the goal of which is to monitor Massport's and Logan Airport tenants' progress toward implementing and achieving their environmental mitigation commitments on schedule and according to the requirements set out in the Section 61 Findings for that specific project. As each project moves forward through its construction phases, its mitigation plan is implemented with an ongoing tracking system to ensure compliance. This chapter provides Section 61 mitigation commitment updates in 2007 for projects for which mitigation is nearing completion or is ongoing (Tables 9-1 through 9-6). The classifications of project status have been modified for this document to clarify project elements that have been implemented and those where implementation is pending.

Projects Nearing Completion of Mitigation Requirements

- Runway End Safety Improvements Project, Executive Office of Environmental Affairs (EOEA) #5122 (Project constructed except for the Runway 33L runway safety area enhancement, which is now a new project which will undergo separate environmental review according to federal and state requirements. Further enhancements are also being considered for the Runway 22R runway safety area).

Projects with Ongoing Mitigation

- West Garage Project, EOEA #9790 (Phase I complete. Phase II construction commenced in 2004 as an expansion to the Central Garage and was completed in early 2007).
- International Gateway Project, EOEA #9791 (Phase 1 was completed in 2004 and Phase 2 was completed in 2007).
- Replacement Terminal A Project, EOEA #12096 (Terminal A opened March 16, 2005).

1 Massachusetts General Law, Chapter 30, Section 61 (M.G.L. c. 30, § 61).

- Logan Airside Improvements Planning Project, EOEA# 10458 (Runway 14-32 construction commenced in 2004, and Runway 14-32 opened on November 23, 2006. The centerfield taxiway improvements received a Federal Aviation Administration (FAA) Record of Decision (ROD) in April 2007. Construction of the centerfield taxiway commenced in the fall of 2007).

Projects Nearing Completion of Mitigation Requirements

Runway End Safety Improvements Project – EOEA #5122

Permitting History

- Certificate on the Final Environmental Impact Report (EIR) issued on March 18, 1992
- Section 61 Findings submitted to EOEA August 10, 1992

Project Status

The Runway End Safety Improvement Project (Figure 9-1) consists of the creation of safety area enhancements at certain runway ends to accommodate aircraft overruns and rescue access in emergency situations.

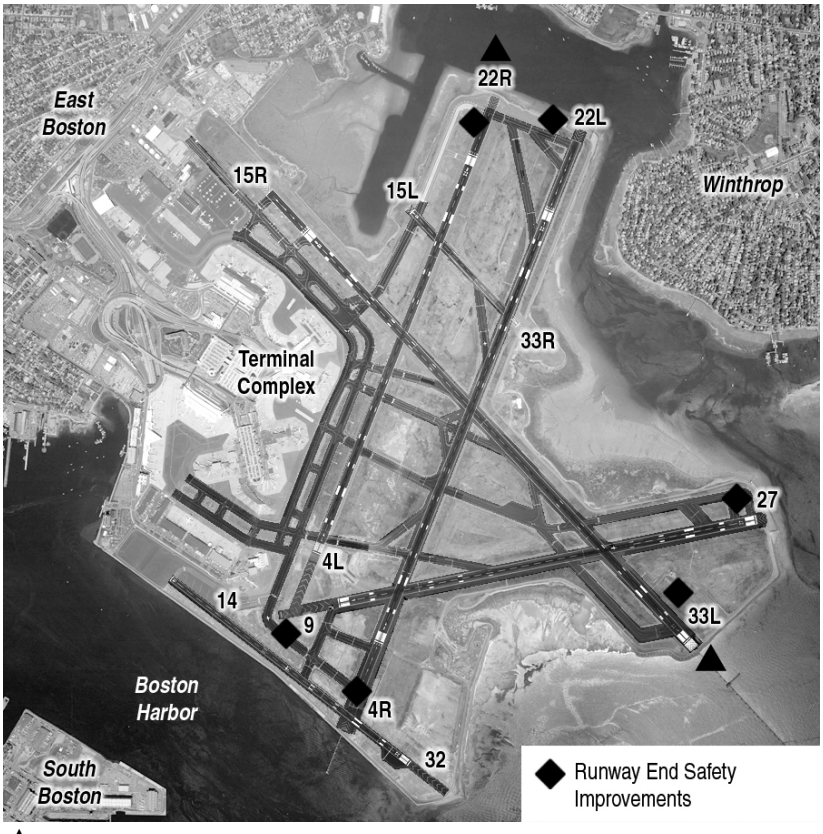
- Safety improvements for Runways 22L, 4L/4R, and 27 are complete.
- In 2005, Massport constructed an Engineered Materials Arresting System (EMAS) bed at the end of Runway 22R in compliance with FAA directives, though no MEPA review was needed. In 2006, as part of a separate project, Massport installed an EMAS bed at the Runway 33L end.
- Consideration of further enhancements to the runway safety areas at the ends of Runways 22R and 33L is now a separate project for which Massport is beginning preparation of an Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) and an Environmental Notification Form (ENF)/Environmental Impact Report in accordance with MEPA. The EA/EIR will examine a number of alternatives for enhancing the runway safety at these locations to be consistent with current FAA design guidelines to the extent practicable. This evaluation will likely lead to a different project, which will have its own Section 61 mitigation commitments that will be reported in subsequent EDRs.

Table 9-1 summarizes the mitigation measures in the Section 61 Findings for the Runway End Safety Improvements Project and Massport's progress in achieving these measures through the end of 2007.



New EMAS bed at the end of Runway 22R

Figure 9-1 Runway End Safety Improvements



▲ Planning concepts undergoing evaluation and/or feasibility analysis.

Table 9-1 Runway End Safety Improvements Project Status Report (EOEA # 5122) Section 61 Mitigation Measures (as of December 31, 2007)

Mitigation Measure	Status
Logan Salt Marsh Replication Project	
Massport agreed to create 25,650 square feet of replacement wetlands along Taxiway November ("N") in the City of Boston.	**Implemented.** The new 56,250 square-foot marsh is located next to Taxiway N. Vegetation established quickly with the help of "donor" stock that was taken from the original salt marsh; several species of fish, egrets, and snowy owls have been observed; and soft-shell clams and other shellfish have established throughout the new marsh.
Massport will assign a wetland specialist to monitor the salt marsh creation and report the findings.	**Implemented.** A wetlands specialist was assigned to the Project. The replication area has developed into a healthy marsh environment, which is indistinguishable from the native marsh.
Monitoring activity will continue during the first two growing seasons to assess the progress of Spartina alterniflora and Spartina patens growth.	**Implemented.** Permits were obtained that required Massport to monitor the health of vegetation, plant, fish, and wildlife for five years. The five-year monitoring program was completed in 1998 and the final Salt Marsh Monitoring Report was filed in February 1999. The Logan Salt Marsh Replication Project is providing more than six times as much salt marsh as was lost to the Runway End Safety Improvements Project.
Lewis Lake Salt Marsh Restoration Monitoring Program	
Massport agreed to provide technical planning and assistance to the Town of Winthrop in the form of a study of the feasibility of restoring salt marsh vegetation at Lewis Lake.	**Implemented.** The Lewis Lake Hydrologic Study was submitted to EOEA and noticed in the Environmental Monitor on June 8, 1993. The study was also submitted to the Winthrop Conservation Commission.
Potential Construction Impacts and Mitigation	
Construction mitigation measures include awarding the project to a single primary contractor; conducting all construction within the silt curtains; conducting a water quality monitoring program; implementing noise control guidelines for airfield construction; coordinating with the FAA to minimize impacts on air traffic operations and runway assignments; construction traffic restrictions and routing.	**Implemented.** Completed for Runways 22L, 27, 4L/4R. Enhancements to the runway safety area for Runway 33L will be part of a new project which will also evaluate potential enhancements to the runway safety area of Runway 22R.

Table 9-1 Runway End Safety Improvements Project Status Report Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Soft-Shell Clam Planting and Monitoring Program	
Soft-shell clam monitoring.[1]	**Implemented.** Massport completed the initial clam relocation and two subsequent annual planting programs. However, due to new FAA guidance regarding the proximity of wildlife attractants to runways Massport has not conducted any more planting programs. In June, 2007, Massport executed an Agreement with DMF relative to the Shellfish Relocation Plan. Under the Agreement, Massport will fund a series of alternative mitigation measures to be implemented by DMF, which include, but are not limited to: (1) improvements to the DMF soft-shell clam depuration facility in Newburyport, MA; (2) conversion of the DMF lobster hatchery on Martha's Vineyard to a soft-shell clam seed production facility; (3) a Boston Harbor water quality monitoring program; or (4) an extension of the DMF Boston Harbor Soft Shell Clam stock enhancement program.. Massport made an initial payment in June 2007 and expects to complete the funding program no later than June 30, 2009. Copies of the Agreement and the MA DEP confirmation were included in *Appendix K* of the *2006 EDR.*
Monitoring Program of Runway Ends Transition Zones	
Monitor the stability of the transition zones at the end of Runways 22L and 27.	**Implemented.** Massport continues to conduct regular inspections to ensure that aggregate stone from the transition zones does not impact wetland and coastal areas, and to re-grade to repair damages as necessary. Several areas of geotextile mattresses which are used to stabilize the seaward perimeter of the aggregate stone have recently begun to exhibit signs of wear. Massport is currently evaluating strategies to repair these mattresses.

Note: Text in italics detailing the mitigation measures is from the Section 61 Findings submitted to the EOEA, August 1992.
1 Mitigation measure was established when obtaining the Wetlands Protection Act variance from the MA DEP and not in the Section 61 Findings.

Projects with Ongoing Mitigation

West Garage Project – EOEA #9790

Permitting History

- Certificate on the Final EIR issued on March 16, 1995
- Section 61 Findings approved on March 27, 1995

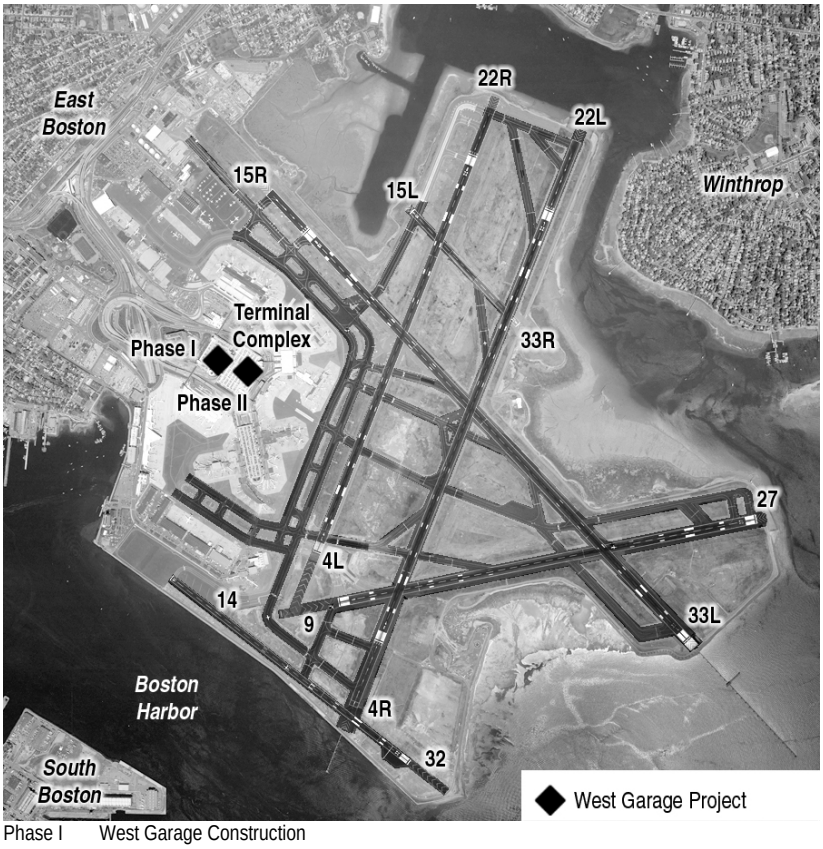
Project Status

The West Garage Project (Figure 9-2) was initially proposed to be constructed in two phases. Phase I of the Project provided 3,150 parking spaces that were consolidated from other areas of Logan Airport. The West Garage is directly connected to the Central Garage, centralizing the two structures' parking into a larger, single functioning, easily accessible garage. The West Garage Project also included construction of elevated walkways connecting the West Garage to Terminals A and E, and improvements to the terminal roadways. The original design of Phase II of the West Garage included the construction of a new structured parking facility adjacent to the West Garage. Instead, Massport concluded it was more cost efficient to proceed with Phase II by adding three additional levels (Levels 5, 6, and 7) to the existing Central Garage. Phase II of the West Garage Project provides approximately 2,800 additional spaces.

- Phase I – Construction commenced in October 1995 and the garage opened on September 8, 1998. The elevated walkways to the terminals were completed in 2002. Improvements to terminal roadways were completed in 2003.
- Phase II – Permitting completed in 2000 to add three levels to the Central Garage. Construction commenced in 2004 and the entire facility was completed in 2007.

Table 9-2 lists each Section 61 mitigation commitment for the West Garage Project and Massport's progress in achieving these measures. Table 9-3 details the elements and status of the Alternative Fuels Program, which was a key mitigation effort associated with the West Garage Project. The mitigation measures in Tables 9-2 and 9-3 are from Section IV Mitigation of the *West Garage Project Final EIR*, January 31, 1995, and those measures referenced in the Massport Board vote on the West Garage Project.

Figure 9-2 West Garage Project



Phase I West Garage Construction
Phase II Addition to Central Garage

**Table 9-2 West Garage Project Status Report (EOEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007)**

Mitigation Measure	Status
Project Design Measures	
Vehicle Circulation and Operation	
Separate airport roadway into enplaning and deplaning levels.	Implemented. The dual level roadway was completed in 2003 with connections to new Terminal E. The remainder on the service roadway systems opened in August 2004. When Terminal A was rebuilt it included separate enplaning and deplaning levels.
Improve access between the Airport Service Road and Route 1A.	Implemented. Construction began in 2000. In January 2003, the new westbound bridge from Route 1A was opened to bi-directional traffic. This occurred in conjunction with the opening of the Ted Williams Tunnel to all traffic. Work was completed in 2007.
Combine operations and vehicle connections between the West and Central Garages.	Implemented. Construction of shared entrance and exit plazas was completed in September 1998.
Pick-up / drop-off areas within the garage at circulation cores.	Implemented. Construction was completed in September 1998.
Improved vehicle flow within the Central Garage.	Implemented. Construction of new high-speed ramps was completed in September 1998.
Provide reliable information about the location and availability of on-Airport parking spaces to eliminate vehicle re-circulation.	Implemented. Massport provides information on peak period airport parking availability through its advertising and public informative programs; and has implemented, in conjunction with "Smart Traveler", a tele-link between Massport's 1-800-23LOGAN and the "Smart Traveler" information system which provides up-to-date parking availability reports. Since August 1999, Web site users may log on to www.massport.com and receive timely parking and traffic information. Massport procured a replacement parking revenue control system that provides an enhanced space count system and directional signage for the West Garage, Central Parking, and the Terminal B Lot. The new revenue control system was fully operational in 2005.
Improve Terminal A curb to promote HOV (high occupancy vehicle) use.	Implemented. HOV curb access at Terminal A was included in Delta Air Lines' design for the Terminal A Replacement Project. The HOV curbs are closest to the terminal and provide ease of access to both the arrival and departure levels. There is no short-term parking at the terminal. The Central Parking Garage is connected to the new Terminal A by an elevated walkway system. Terminal A opened on March 16, 2005.
Pedestrian Circulation and Amenities	
Enhance pedestrian connections between Central and West Garages and terminals.	Implemented. Climate-controlled pedestrian bridges with moving and stationary sidewalks were constructed to connect the West Garage to Terminal A and E. These pedestrian amenities opened at the same time as Phase I of the West Garage in 1998. Terminals B and C pedestrian connections began construction in the summer of 1999 and were completed in 2002. An additional connection was added between the Hilton Hotel and the West Garage.
Provide airport-wide baggage cart access.	Implemented. Baggage carts and access for pedestrians became fully available in the completed West Garage via the elevated walkways to Terminals A and E. Baggage carts are available throughout the Airport, in the terminals and in the parking garages.

Table 9-2 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Building Design Features	
Incorporate shield rooftop lighting with directional shielding to minimize glare. Install shield heating, ventilation, and air conditioning (HVAC) equipment to minimize noise.	Implemented. Construction was completed in September 1998.
Massport will continue to meet with the Community Working Group (CWG) to review the building's design and to explore other design improvements that might address specific issues identified by the CWG such as the two aforementioned measures.	Implemented. Massport staff held community meetings/CWG workshops during the design of the West Garage Project (during 1995 and 1996).
Construction Period Mitigation	
Agency and Community Coordination	
Designation of personnel to provide rapid response to construction issues and problems. Designate a liaison person to respond to any community concerns.	Implemented. The Logan Modernization (formerly Logan 2000) Construction "Response-line" was created and placed in service in late February 1996. Since its implementation, no calls were received. Construction-related issues are handled through the Office of Government & Community Affairs (OGCA) community response liaison. OGCA has designated liaisons to respond to community concerns.
Prepare newsletters and hold community meetings during the construction process.	Implemented. The West Garage Highlights newsletters were produced to coincide with all Draft EIR and Final EIR filings for Logan Modernizations projects. Massport announced all public comment periods in local papers. Community Forum meetings were noticed in community newspapers. Numerous community meetings were held for the general public and the CWG. In early 2001, a construction update feature was added to the Massport website. This section is updated periodically to inform interested parties about upcoming construction impacts associated with Phase II. The website allows users to add their addresses to a subscriber list. The subscribers on the list were notified when there were significant updates to the construction section.
Continue to coordinate construction activities with other governmental agencies as appropriate.	Implemented. During construction, Massport staff held biweekly construction meetings with the contractor, CA/T, and Massport Operations. Massport has staff dedicated to daily interagency coordination, with the assistance of consultant personnel. Meetings were held with the CA/T staff on an as-needed basis with regard to the 7D2 and the 8A construction process. Establishment of the Massachusetts Bay Transportation Authority's (MBTA's) new Blue Line Airport Station was an element of the 8A construction. The MBTA opened the new station in June 2004. Massport and MBTA continue to collaborate on Silver Line Airport service.
Placement of personnel and equipment to monitor and report on the status of construction.	Implemented. Massport hired full-time construction management staff during Phase I who maintained daily reports and logs for all construction activities including any potential impacts or mitigation measures. Reports and logs were maintained for traffic, parking, noise, soil disposal, etc. Monitoring continued through Phase II.

Table 9-2 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Creation of specific construction-related performance standards for incorporation into construction contracts, such as: ■ *Safety and security measures;* ■ *Site appearance and housekeeping requirements; and* ■ *Site logistics and traffic control measures.*	Implemented. The West Garage contract specifications included standards and requirements for safety and security, site appearance, and site logistics and traffic control. These standards and requirements were adhered to during construction of Phase I of the West Garage Project and Phase II Central Garage expansion.
Ground Transportation Mitigation During Construction	
Construction vehicles will be required to use either state highways (Route 1A, I-90, and the main airport roadway) or Logan Airport roadways for access to and from the construction site, unless accessing local businesses. Truck routes designed to minimize impacts to the regional highway network and neighborhoods will be specified in contractors' construction specifications.	Implemented. The West Garage Project's construction specifications required the use of designated truck routes. During construction of Phase I, truck routes were restricted to Airport service roads and roads accessed from either the Ted Williams Tunnel and/or Route 1A. East Boston streets were not utilized. These mitigation measures also were employed during the Phase II Central Garage expansion.
Concrete production and batching will occur in existing plants with access via Route 1A or I-90 in order to reduce on-Airport construction activities and consolidate truck trips to greatest extent possible.	Implemented. On-site concrete production and batching were prohibited during Phase I of the West Garage Project. Contractors used concrete suppliers that accessed the site via Route 1A from the north. Concrete production and batching was conducted off-site and product delivery was consolidated in as few truck trips as possible. These mitigation measures also were followed as part of the ongoing Phase II Central Garage expansion.
Construction companies will be required to provide off-Airport parking for their employees. No construction employees will be allowed to park at the construction site or anywhere at the Airport, except for a small number of supervisory personnel.	Implemented. During Phase I of the West Garage Project, on-site parking was limited to 30 spaces for supervisory personnel and equipment only. Parking permits were issued to enforce these rules. The State Police towed vehicles parked without permits. These mitigation measures also were completed during the Phase II Central Garage expansion.
Construction workers were expected to access the site via public transportation or via shuttle buses from off-Airport parking areas. Massport will encourage construction workers to use Logan Express, Water Shuttle, MBTA, and other modes of public transportation.	Implemented. Massport provided construction contractors with information about public transportation alternatives for their workers and also allowed construction workers to purchase discounted monthly passes for Logan Express to encourage use of these services. Massport also encouraged construction contractors to join the Logan Employee Transportation Management Association (Logan TMA), which is open to all airport employers. During the construction period of Phase I of the West Garage Project, construction workers were encouraged to use public transportation and the aforementioned Massport services to access the job site. These mitigation measures also were employed during the Phase II Central Garage expansion.
Massport will explore the feasibility of consolidated off-Airport parking for construction workers.	Implemented. Massport reviewed the costs and feasibility of providing consolidated off-Airport parking. Because workers commuted to the Airport from many different destinations, using many modes of transportation, this option did not appear cost-effective or practical until the number of contractor employees exceeded 500-600. During Phase I, Massport monitored the schedules, but the number of contractor employees (approximately 250) did not exceed the quantity needed to provide a consolidated off-site parking area.

Table 9-2 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Massport will encourage the provision of consolidated shuttle bus service and will encourage the use of alternative fuel vehicles (AFV).	Implemented. Massport reviewed the costs and feasibility of providing a consolidated off-Airport shuttle bus for contractor employees. During Phase I, Massport monitored the schedules to determine if employees exceeded 500 to 600, but the number of contractor employees (approximately 250) did not exceed the quantity required for Massport to provide an off-Airport shuttle bus service.
Massport will construct temporary roadways as necessary to maintain operation of all Airport roadway connections and minimize impacts to on-Airport traffic patterns.	Implemented. Contract plans and specifications required maintenance of the existing number of traffic lanes throughout construction of Phase I. Temporary lane closures were conducted during off-peak hours (midnight to 5:00 AM). Any other extended closures required the construction of a temporary detour. These mitigation measures also were employed during the Phase II Central Garage expansion.
Massport will develop specific construction staging plans, including acceleration and deceleration lanes for trucks and maintaining the existing number of travel lanes.	Implemented. During construction of Phase I of the West Garage Project, truck access was provided via a separate lane off the Airport U-turn to minimize disruption to inbound and outbound Airport traffic. The existing travel lanes were maintained at all times. These mitigation measures also were employed during the Phase II Central Garage expansion.
Construction Management	
Control noise by: ■ *Pre-auguring pile locations and the use of pre-cast concrete piles in lieu of steel piles.* ■ *Using noise control techniques to reduce noise from pile driving by at least 5 A-weighted decibels (dBA) below their unmitigated levels.*	Implemented. All piles used in Phase I were pre-cast concrete with pre-auguring. No steel piles were used. Concrete piles were drilled for largest portion of their depth to minimize noise impacts. No piles were driven after 4:00 PM. During construction, further noise evaluation was not required for the West Garage since noise levels did not exceed applicable regulations. All specifications and performance standards were incorporated into the construction contract.
Control noise by: ■ *Evaluating further noise control options during project design.* ■ *ıncorporating appropriate operational specifications and performance standards into the construction contract documents.* ■ *Monitor community noise levels during construction to verify compliance with contract specifications and applicable state and local noise regulations.*	Implemented. These noise mitigation measures also were employed during the Phase II Central Garage Expansion.
Hours of work generally will be limited to typical working hours of 7:00 AM to 5:00 PM unless constrained by operational conditions at the Airport.	Implemented. Work involving roadway lane closures was conducted after 5:00 PM or before 7:00 AM during Phase I. These mitigation measures also were employed during the Phase II Central Garage expansion.
Adequate storage areas for construction materials will be located away from residential areas.	Implemented. During construction of Phase I, all storage of materials occurred on the construction site very far from the residential areas. Due to limited available space, very little construction materials were stored on-Airport during Phase II. Following community coordination, a section of the North Service Area was used for temporary staging.

Table 9-2 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Fugitive dust will be controlled through wetting, sweeping, and other dust suppression techniques. Massport will require contractors to maintain on-site water trucks. All trucks hauling materials and excavation from the site will be covered.	Implemented. During construction of Phase I, a water truck was maintained on-site at all times and road sweeping occurred as required to clean any debris dropped on road or tracked by tires. These mitigation measures were employed during the Phase II Central Garage expansion.
Massport will mitigate construction-related air quality impacts through the on-Airport traffic flow maintenance procedures and the use of good housekeeping practices to minimize fugitive dust.	Implemented. During construction of Phase I, the contractor maintained on-site wheel washes, water trucks, and road sweepers to control fugitive dust. These mitigation measures were employed during the Phase II Central Garage expansion.
Develop a Draft Soil Management Plan.	Implemented. The Soil Management Plan, a component of the Logan Modernization Environmental Plan, was enforced during construction. The soil excavation activities associated with the West Garage Foundation project were completed. No remediation waste was identified; all non-remediation waste excavated (total Petroleum Hydrocarbons were less than 500 mg/kg) was shipped off-site to approved off-site disposal facilities under a MA DEP Material Shipping Record. Massport conducted oversight of the contractor's compliance with the Soil Management Plan. No soil excavation was required as part of Phase II.
Develop a Draft Dewatering Management Plan which addresses requirements for testing, handling, and treatment of contaminated groundwater from de-watering prior to discharge.	Implemented. A final Dewatering Management Plan was incorporated into the Logan Modernization Environmental Plan. During the West Garage Foundation project, all de-watering was performed in compliance with Logan Modernization, Massachusetts Contingency Plan (MCP) requirements and Massport's National Pollutant Discharge Elimination System (NPDES) permit. Massport's oversight of the contractor's compliance with the De-watering Plan continued during the West Garage superstructure construction project. No construction dewatering was required as part of Phase II.
Develop a Draft Stormwater Pollution Prevention Plan which is intended to keep the Airport's storm water system free of sediment and contaminants during construction. The plan will be incorporated into construction plans, specifications, and contracts.	Implemented. A final Stormwater Pollution Prevention Plan (SWPPP) was incorporated into the Logan Modernization Environmental Plan. During the West Garage foundation project, the contractor complied with the requirements specified in the SWPPP. Massport's oversight of the contractor's compliance with the SWPPP continued during the West Garage superstructure construction project. No violations were reported. These mitigation measures also were employed during the Phase II Central Garage expansion.
Develop a Draft Health and Safety Plan which provides the minimum health and safety specifications that contractors must meet during construction, including requirements for environmental monitoring, personnel protective equipment, site control and security, and training.	Implemented. A final Health and Safety Plan (HASP) was incorporated into the Logan Modernization Environmental Plan. During the West Garage foundation project, the contractor performed its activities in compliance with the HASP. Massport's oversight of the contractor's compliance with the HASP continued during the West Garage superstructure construction project. The contractor submitted a specific safety and security plan for review and approval by the construction manager. The Terminal Area Coordinator maintained regular (at least weekly) site audits to verify compliance. These mitigation measures also were employed during the Phase II Central Garage expansion.
Rodent control inspection, monitoring, and treatment will be carried out before, during, and at the completion of all foundation and utilities demolition and construction work.	Implemented. Rodent control was not an issue during construction of Phase I of the West Garage Project or during Phase II.

Table 9-2 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Massport has asked the contractor to review other construction mitigation measures including disposal of excavated materials, fences, and wheel washing.	Implemented. During construction of Phase I of the West Garage Project, Massport installed and maintained graphic panels on all construction fences to provide a more pleasing appearance to the construction site. Wheel washing was required at all times. Disposal of excavated materials was compliant with the Soil Management Plan. These mitigation measures also were employed during the Phase II Central Garage expansion.
Parking Pricing	
Parking pricing initiatives: keeping first-hour price high enough to provide a disincentive for pick-up/ drop-off.	Implemented. Massport continued to evaluate and adjust the first-hour price of parking. In light of the security prohibition on curbside parking, in 2002, Massport reduced the cost of the first half-hour from $4 to $2, the first time it has changed since the first-hour free rate was rescinded in 1998. In June, 2007, rates increased to $3 for the first half-hour.
Parking pricing initiatives: keeping the weekly price low enough to encourage vacation travelers to park for a week.	Implemented. Massport encourages long-term parking by providing cheaper parking at its Satellite Economy Lots. Data on long-term parking use are provided in *Chapter 5, Ground Transportation.*
Massport will consider means to encourage the use of limited amount of on-Airport commercial parking for long-term parking and promote environmentally positive modes of airport access by air passengers.	Implemented. An important element of Massport's strategy to reduce the impact of Airport-related traffic on regional highways and local streets in neighboring communities is the Massport Parking Pricing Policy. Historically, Massport's Parking Pricing Policy encouraged long-term parking over short-term parking. That was accomplished by charging a premium for time spent in the on-Airport parking facilities between one and four hours and substantially reducing the per hour rate for parking durations longer than four hours. This strategy has proved to be a successful incentive for passengers to drive themselves and park long-term at Logan Airport rather than having someone else drop them off or pick them up.
Once sufficient data has been collected, Massport will evaluate parking behavior that may be attributable to the modified rates and consider further adjustments in pricing that will assist in achieving Massport's ground transportation goals.	Implemented. Massport's current parking rate structure is compatible with continued growth in long-term parking and declines in pick-up/drop-off mode shares, and the continued goal to increase in the total HOV use by air passengers toward 35.2 percent HOV access mode share. Adjustments to hourly parking rates have been made to reflect usage patterns.
Executive Director shall report to Massport annually regarding the effectiveness of parking pricing policy in achieving Massport's ground access goals initiatives and recommend appropriate policy adjustments.	Implemented. In October 2001, Massport Board granted approval of commercial parking rates consistent with Massport's ground access goals. The higher rates went into effect November 12, 2001. In addition, in light of the new security restrictions on curbside parking, Massport reduced the cost of parking for the first half-hour from $4 to $2. In June, 2007, the cost of parking for the first half-hour increased to $3. These modifications should foster the use of alternate forms of transportation for getting to Logan Airport, whereas the weekly cap at Economy parking encourages long-term parking over pick-up and drop-off as a mode of access.

Table 9-2 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Concurrent Ground Access Improvement Mitigation Measures	
Employee Trip Reduction Measures	
Massport will form a Transportation Management Association (Logan TMA) for Logan Airport employees to provide new opportunities for the development of targeted transportation demand management (TDM) strategies for Massport and airport tenant employees.	Implemented. In the 1995 Board Resolution, Massport's Executive Director was authorized to expend an initial amount of up to $50,000 for the purpose of organizing the Logan TMA. The Logan TMA was created in March 1997. Massport continues to support the Logan TMA by providing the Logan TMA with $65,000 annually, as well as space and equipment for the Logan TMA store in Terminal C. In turn, the Logan TMA has a Logan TMA Coordinator who develops, coordinates, and implements effective TDM strategies including discounts on HOV services.
Massport will provide support for the formation and operation of the Logan TMA.	In late 2006 , Logan TMA staff requested a meeting with all major employers at Logan Airport to explain existing Logan TMA programs, and to explore commuting issues that the Logan TMA might be able to help address. Logan TMA staff arranged a series of one-on-one meetings with those employers who responded positively; the Logan TMA staff then conducted the meetings. Based largely from the information gathered at those meetings a series of new commuting initiatives was launched by the Logan TMA in 2007. See *Chapter 5, Ground Transportation* for details on these initiatives.
Massport will seek to develop, coordinate, and implement effective TDM strategies to reduce the number of single-occupant trips made by all Logan Airport employees.	Implemented. Massport is currently working with the Executive Office of Transportation and Public Works (EOTPW) (which provides the Logan TMA coordinator position through their MassRIDES program) to restructure the Logan TMA membership. As part of the restructuring effort, the Logan TMA will be having conversations with each employer in order to develop future TDM services that best meet their needs. The 1995 Board Resolution authorized Massport to actively explore with the Logan TMA the feasibility of implementing various services. Massport assists the Logan TMA in providing services and by conducting the Logan Airport Employee Survey intermittently (the most recent survey was conducted in 2007) to collect data useful to the Logan TMA.
Massport will encourage participation by all employees, but will particularly target the airport's largest employers.	Implemented. Massport continues to target Logan Airport's largest employers. Refer to *Chapter 5, Ground Transportation*, for more details on the Logan TMA and its membership.
Massport will report on the formation and activities of the Logan TMA in the next Generic Environmental Impact Report (GEIR).	Implemented. The Environmental Status and Planning Reports (ESPRs) and EDRs provide detailed information on the Logan TMA, its services, membership, and employee commuter choices (via the Logan Airport Employee Survey). Logan TMA information is provided in *Chapter 5, Ground Transportation* of this *2007 EDR*.
Massport proposes to implement a new Logan Express service or other HOV service depending on the needs of the targeted market before Phase II of the West Garage Project is operational.	Implemented. Massport completed its market-based analysis for a North Shore Logan Express in March 2000. The Peabody Logan Express facility opened in September 2001 (See *Chapter 5, Ground Transportation* for additional information on Peabody Logan Express).

Table 9-2 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Provide an airport shuttle service from South Station Transportation Center. Massport is preparing a feasibility and business plan for a South Station-Logan Airport shuttle service and will implement this service when the Third Harbor Tunnel is opened for commercial traffic. This service will be modeled on the existing, successful Logan Express services and will include frequent bus service between South Station and the airport terminals. *Massport will regularly evaluate the frequency of, and demand for, such shuttle service and will provide such service at the greatest frequency that is practical and effective*.	Implemented. In 1997, Massport sponsored the development of a joint public/private partnership with intercity bus operators serving the South Station Transportation Center. This partnership resulted in a bus connection that both the carriers and Massport promote. The service had limited success largely because of variable operator schedules and the fact that the service operates out of the South Station Transportation Center instead of a location closer to the South Station Red Line stop. To improve the service between South Station and Logan Airport, Massport initiated a service, Logan DART, in November 2000. Massport anticipated that this service would provide an interim connection between South Station and Logan Airport until the opening of the South Boston Piers Transitway. This service competed with other frequent commercial bus services between South Station and Logan Airport, including Concord Trailways, Dartmouth Coach, Plymouth & Brockton, Bonanza, Vermont Transit, and C&J Trailways. Together, these services provided more than 50 daily weekday departures from South Station from 4:45 AM to 11:45 PM. Due to the poor ridership on DART, the numerous options available from South Station, the financial impacts following September 11, 2001 and the scheduled opening of the Silver Line Extension/AITC, Massport suspended this service in November 2001. In the interim, Massport coordinated a database of existing South Station/Logan Airport services provided by scheduled carriers and has produced flyers to improve visibility of this service to the public. This service accommodated passenger demand between South Station and Logan Airport until Silver Line service to Logan Airport commenced in June, 2005 (refer to *Chapter 5, Ground Transportation* for additional information). The Silver Line Airport service now provides this direct link.
Massport will implement a new water shuttle service in Boston Harbor before the opening of Phase I of the West Garage Project. The water shuttle would run between Logan Airport and one, or possibly, more sites in the Harbor.	Implemented. Massport identified a number of possible destinations for a new water shuttle service, with the Quincy Shipyard and Long Wharf sites meeting the basic service parameters. Harbor Express was chosen as the water shuttle operator and began operation between the Airport and these two sites in November 1996. Massport continues to support the Rowes Wharf Water Taxi and City Water Taxi operations. Refer to *Chapter 5, Ground Transportation* for water shuttle ridership information.
The Executive Director shall make recommendations to Massport for budgetary appropriations to establish and implement the new ground access services on a schedule that permits Massport to implement the new ground access services within these time frames.	Implemented. The Executive Director recommends budgetary appropriations for ground access services on an annual basis.

Table 9-2 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Enhancement of Existing HOV Services	
Expand Logan Express hours of service.	Implemented. Service is offered from Braintree as early as 3:15 AM; from Framingham as early as 4:00 AM and as late as 11:00 PM; from Woburn as early as 3:30 AM and as late as 11:00 PM; and from Peabody as early as 4:15 AM and as late as 1:15 PM. Buses leave every hour or half hour. The Logan Express schedule is available at www.massport.com.
Provide a guaranteed ride home for Logan Express users.	On-hold. From January 1995 until November 2001, Massport provided this service for air passengers and Logan TMA members. Due to financial constraints following September 11, 2001 this program was suspended for those passengers arriving after midnight with pre-purchased round-trip Logan Express tickets. Logan TMA members still benefit from this service.
Provide Logan Express price incentives.	Implemented. Massport continues to monitor price incentives and evaluates additional incentives to promote Logan Express ridership.
Develop an additional Logan Express service.	Implemented. Massport opened a fourth Logan Express in Peabody, Massachusetts in September 2001, years before the Section 61 Commitment date of the opening of Phase II of the West Garage Project. While the new service was initially planned to operate on a half-hour schedule like the Braintree, Framingham, and Woburn services, because of the dramatic air passenger reductions after September 11, 2001 (during Peabody's first week of service), to cut costs, Massport operated the Peabody Logan Express on hourly headways. In January 2004, in light of low levels of ridership on the Peabody Logan Express, Massport doubled service by going to a half-hourly schedule in an effort to stimulate ridership growth at Peabody. However, in 2004, annual ridership levels at Peabody continued to be low, approaching 77,000 as compared to 527,000 at Braintree, 379,000 at Framingham, and 283,000 at Woburn. The trend of low ridership at Peabody continued in 2007. Annual ridership levels at Peabody, Braintree, Framingham, and Woburn were approximately 63,000, 498,000, 369,000, and 272,000 in 2007, respectively. Given the low levels of ridership on the Logan Express in Peabody, Massport continues to evaluate modifying or closing this service and redeploying its financial resources on more productive and cost-effective HOV services.
In conjunction with the MBTA, Massport will pursue joint ticketing opportunities for the Hingham Commuter Boat and the Logan Airport Water Shuttle.	Implemented. As reported in the *1999 ESPR* and the *2000 EDR*, this ticketing program was explored, implemented in mid-1995 and discontinued in 2000 since many of the former users of this program now use the Harbor Express Service direct from Quincy to Logan Airport.
Massport is reviewing the fee schedules and operating requirements of the dock in order to make it more accessible and convenient to potential water taxi operators.	Implemented. In the fall of 1995, Massport made physical improvements to a low-freeboard float at the Logan Dock to create a dock capable of accommodating smaller vessels such as water taxis. In the fall of 2002, Massport completed expansion of the Harborside dock to accommodate the demand of additional vessels and to comply with handicapped accessibility requirements. The improved dock increases capacity from a two float system to a seven float system to accommodate the various water shuttles, taxis, and charter boats that are licensed to use it.
Expand docking capacity at Logan Airport for water taxi and other services.	Implemented. Massport accommodated water taxi services, enhanced the dock as described above, provided communication links for passengers to call the taxi, and allowed taxi passengers to use the free water shuttle buses to access the terminals from the dock. Water taxi information was posted on the Massport website. Details on the Water Taxi are provided in *Chapter 5, Ground Transportation*.

Table 9-2 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Initiate a new Boston Harbor Water shuttle service.	Implemented. Harbor Express service, between Logan Airport and the South Shore, began in November 1996, well before the opening of Phase I of the West Garage in September 1998. In 2001, the MBTA took over operations of this service.
Other Measures	
Coordinate with public and private entities to provide more extensive radio, television, and telephone announcements of poor traffic conditions with suggestions for alternative access modes.	Implemented. The 1-800-23LOGAN Ground Transportation Line includes a direct link to "Smart Traveler." Callers to both the Ground Transportation Line and to Smart Traveler may access the latest traffic information, parking information, or learn about alternative forms of transportation to and from Logan Airport. Starting in August 1999, real-time traffic information and parking became accessible on Massport's website. Massport regularly contacts the media to inform the public about roadway changes, parking shortages and to encourage travelers to use HOV services. Similar information is disseminated on the Logan Airport e-mail subscriber list and on the Massport website.
HOV Marketing and advertising. Massport will continue the advertising and marketing programs for HOV services with an emphasis on promoting MBTA, Logan Express and water shuttle services to and from the airport.	Implemented. Massport spent more than $103,000 on marketing of Logan Express in 2007. Massport continues to promote HOV services including availability; schedules and fares to consumers through the ground transportation Information Line at 1-800-23LOGAN and the website that provides up to the minute information. HOV advertising boards, schedules, and maps are placed at all Logan Airport terminals, at the MBTA Airport Station and at all shuttle bus pick-up/drop-off locations. A brochure for Logan Airport water shuttle service was completed and distributed to the terminals and travel professionals. Water transportation service to downtown Boston was advertised in the following ways: ■ In 2004, Massport prepared and distributed a brochure promoting passenger water transportation to and from Logan Airport. The brochure was centered around a new harbor wide map that also was included on new signs installed at the Logan Airport dock facility. These materials directed passengers to either the MBTA Harbor Express scheduled ferry or one of three on-call water taxi businesses serving the Airport. ■ Massport staff participated in the MBTA "Water Transportation Week" promotion kick-off event in 2005, which was held at Rowes Wharf. At Logan Airport, Massport updated signs on baggage carousels in the terminals and created new vendor signs which were mounted at the dock. In addition, Massport prepared briefing packages on the various water transportation services for its public information staff working in the terminals so that they could disseminate the most current and accurate information to the public. Similarly, Massport updated its website and 1-800-23-Logan services.

Table 9-2 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Prepare an inventory of private scheduled services including origins/destinations, schedule, and cost.	Implemented. Massport continued to update and track information and services by more than 700 privately operated passenger services certified to operate at Logan Airport. Industry changes with such operations make publication of reliable service and schedule information impractical, if not impossible. However, Massport continued to expand and update information on transportation options to Logan Airport using the latest information technologies, including: ■ Information and links to transportation companies on the Massport website. Some sites accessed through internet links provided passengers with on-line reservation services; ■ Most scheduled service operators provided placards with current schedules posted in bus stop shelters located on the curb at each terminal. Individual bus schedules were also available at the information booths; and ■ Transportation information database for on-line assistance at Logan Airport terminal information booths.
Proceed with environmental review and seek funding for construction of People Mover system.	Implemented. Massport completed the EA and Major Investment Study for the Logan Airport Inter-modal Transit Connector (AITC). The AITC evolved out of the People Mover EIR/MIS process and evaluated new access routes to both the Blue Line and the South Station Transportation Center. On February 25, 1997, Massport submitted to the United States (U.S.) House Committee on Transportation and Infrastructure an application for the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) funds for the next phase of environmental review, planning and design of the AITC. Congressman J. Joseph Moakley was the congressional sponsor; the project also has the support from the Secretary of Transportation and the U.S. Environmental Protection Agency (EPA). The Logan AITC was included, for an unspecified funding level, in the 1997 ISTEA reauthorization bill. In 1998, Massport received a certificate on a Notice of Project Change for the People Mover from the Secretary of Environmental Affairs and a Finding of No Significant Impact (FONSI) on an EA from the Federal Transit Authority. In June 2001, Massport and the MBTA executed an interagency agreement for the purchase of eight (8) Silver Line dual mode buses and the Massport Board approved the expenditure of approximately $13 million for this purchase. In 2004 Massport and the MBTA finalized the 10 year/$20 million dollar Inter-Agency Operating & Maintenance Agreement. The MBTA and Massport also tested the prototype bus on the Airport roadway system, checking vertical clearances, turning radii, and pick up/ drop off locations. Initial Silver Line service to the Airport began in December 2004 and full service began in June 2005 (refer to *Chapter 5, Ground Transportation* for additional details). In 2005, Massport and MBTA initiated planning to provide automated fare collection/Charlie Card equipment in each of the Logan Airport terminals. Charlie Card ticketing opened at Logan Airport in November 2006.
Alternative Fuels program. Massport is carrying out an extensive program to convert existing Massport-owned service vehicles to environmentally preferable sources. Table IV-2 summarizes the elements of the alternative fuels program and the schedule for their implementation.	Implemented. Table 9-3 of this *2007 EDR* details Massport's progress in achieving these measures.

Table 9-2 West Garage Project Status Report (EOEA #9790) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Measuring, Monitoring, and Evaluating Ground Access Improvements	
Massport will assess progress towards the achievement of HOV goals using on-Airport Automated Traffic Monitoring Systems (ATMS).	Implemented. ATMS is composed of three technologies that detect vehicle movement: inductive loop lines acoustic sensors, and canoga cards. Upgrades of the ATMS equipment, program software and infrastructure are underway and will result in accurate, meaningful vehicle counts. With the completion of the Terminal Area Roadway system and other regional highways expected in the near future, Massport prepared a long-range ATMS plan that will provide daily traffic counts at all gateways and other critical locations. Massport will be using new technologies in order to utilize on-Airport traffic signal controllers and loops for traffic counting. This project is now in the capital budget. Project was bid in the summer of 2008.
Massport will assess progress towards the achievement of HOV goals by monitoring parked vehicles using systems such as the parking and revenue control (PARC) system.	Implemented. Massport monitors all parking activity at Logan Airport and inventories all commercial parking facilities on a daily basis. Updated PARC systems were installed in the Terminal B Garage in 2004, with Central/West Garage following in 2005. Terminal E and Economy Lot 2 also have PARC systems.
Monitor HOV Services (Logan Express, MBTA, water shuttle, limousine/bus, and taxi).	Implemented. Massport maintains a "real time" log of dispatcher reports for Logan Express, the taxi pool, and the bus/limousine pool and other ground transportation operations at Logan Airport. Massport coordinates with the MBTA and the operators of all water shuttles serving Logan Airport to track ridership and service schedules. Daily Logan Express ridership and operations data are submitted monthly to Massport. Massport maintains a Passenger Water Transportation Ridership Summary on a monthly basis. Massport maintains a continuing record, the Ground Transportation Unit (GTU) Daily Event Log, of all occurrences impacting the Airport roadways, terminal curbs, and access roads. This log cites such events as accidents, lane closures, bus delays, as well as routine and non-transportation events.
Monitor passenger activity and employee modes of transportation.	Implemented. The most recent employee and air passenger surveys were conducted in the winter/spring of 2007. See *Chapter 5, Ground Transportation* for details.
Massport supports the use of Automated Vehicle Identification (AVI) to monitor, manage, and facilitate efficient traffic operations at Logan Airport and elsewhere on the regional transportation system.	Implemented. An AVI system for Massport's Aviation Transportation Department has been designed. However, capital funding has been delayed due to the impacts of September 11, 2001.
Track the effectiveness of ground access measures.	Implemented. Massport continues to track the effectiveness of its ground access mitigation programs in its annual MEPA filings. See *Chapter 5, Ground Transportation* for details.

Note: Text in italics detailing the mitigation measures is from Section IV, Mitigation of the *West Garage Final EIR*, January 31, 1995.

Table 9-3 Alternative Fuels Program — Details of Ongoing Section 61 Mitigation Measures for the West Garage Project (as of December 31, 2007)

Program Element	Projected Date of Completion/ Acquisition	Status
Purchase four electric passenger utility vehicles	Winter 1995	Implemented.
Purchase five electric sedans	Winter and Summer 1995	Implemented.
Build compressed natural gas (CNG) quick-fill station	Spring 1995	Implemented. The station has been operational since 1995. It is New England's largest CNG quick fill station and serves Massport's vehicles, over two dozen Airport tenants, and nearby fleet vehicles. New higher flow dispensers at the station have reduced fueling time for heavy-duty vehicles, and have increased storage capacity at the station. Currently, more than a dozen companies and organizations are fueling natural gas powered vehicles at the station. In 2007, the station pumped approximately 29,800 gallon equivalents per month. Additional above-ground storage was also provided. Massport anticipates the station to be relocated in conjunction with some redevelopment of the North Cargo Area.
Purchase five electric buses	Spring and Summer 1995	Implemented. Massport purchased two electric buses and leased one. These vehicles operated at Logan Airport between 1996 and 2001. After more than six years of testing and evaluation, Massport determined that electric buses are neither durable nor dependable enough to function effectively in the demanding operating environment at Logan Airport.
Purchase five electric pick-up trucks	Spring 1995	Implemented.
Use soy-blend diesel fuel	Spring 1995	Implemented. Massport's shuttle fleet operated on soy diesel from 1995 to 1999. In 1999, all the buses were replaced with CNG buses, which are still in service.
Purchase additional AFVs	Spring 1995	Implemented. Refer to *Chapter 7, Air Quality/ Emission Reduction* for a list of AFVs.
Purchase six CNG buses	Summer 1995	Implemented. There are 26 CNG shuttle buses in the current fleet.
Purchase four electric vans	Summer 1995	Implemented.
Install quick-charge kiosks for electric vehicles	Summer 1995	Implemented. There are 15 inductive quick-charge stations.
Develop slow-charge infrastructure	Ongoing	Implemented. Fourteen dedicated conductive charging locations were established at the Tower Parking Lot, Central Parking, Facilities, the Bus Maintenance Facility, and the Water Department. Six of these charging stations were removed when the Central Garage was expanded.

International Gateway Project (Terminal E) – EOEA #9791

Permitting History:

- Certificate on the Final EIR issued on December 2, 1996
- Section 61 Findings submitted to EOEA June 26, 1997

Project Status

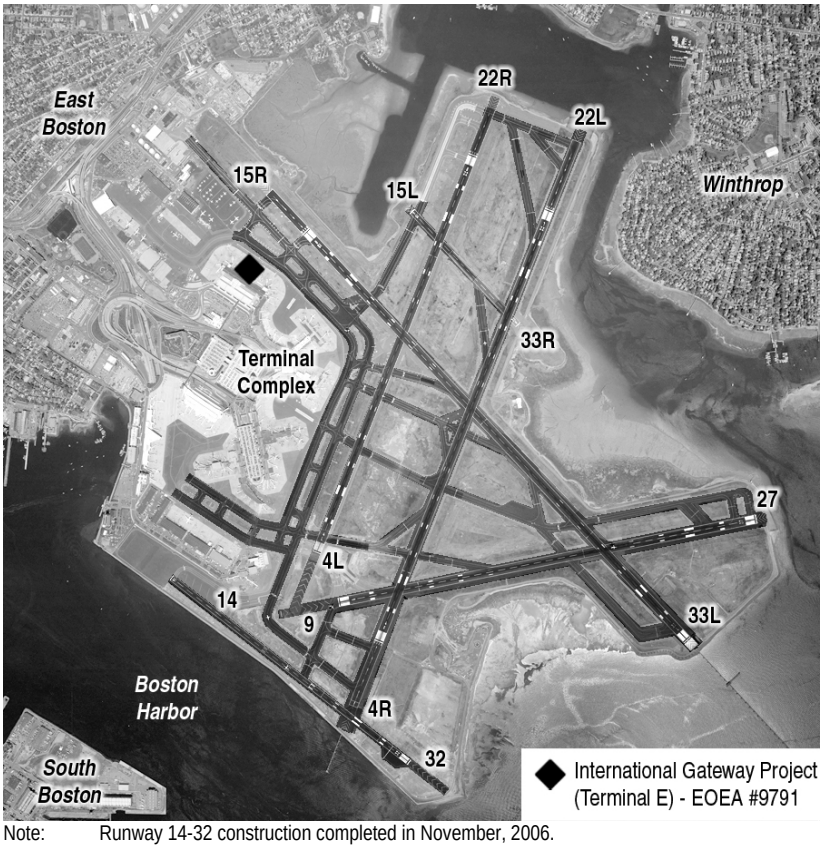
The International Gateway Project (Figure 9-3) expands and upgrades Terminal E to provide better service to international passengers. The original Terminal E was opened in 1974 and over time became outdated and too small to accommodate the growth in international travel. This project is being constructed in phases:

- **Phase 1 –** This phase of the project included a weather-protected outside airside bus portico with an elevator and escalator linking the ground floor with the second floor to accommodate passengers arriving on remotely parked aircraft that are unable to park at a gate because it is occupied by another aircraft.
- **Phase 2 –** This phase of the project enlarged Logan Airport's congested FIS Facility, and improved the meeter/greeter lobby and the ticketing area of Terminal E to maximize passenger convenience and reduce processing times in the terminal. The project called for the reconstruction and expansion of Terminal E in and around the existing terminal while keeping it operational and safe. The new departure hall includes high ceilings, wood paneling, built-in artwork, and views of the city skyline. Additionally, to reduce curb and roadway congestion at Terminal E, this project also included a new separated roadway system for arrivals and departures.
- **Future Phase –** This phase involves the construction of a new West Concourse, which will add three new gates to Terminal E to accommodate wide-body aircraft.

Construction of this project commenced in the summer of 1998. Phase 1 was completed in 2004. The departure level of the new $321 million terminal, including the new ticketing hall and departure level roadway, opened in May 2003. Enlargement of the FIS Facility and construction of the new arrivals level was completed in early 2007. Phase 2 is now complete. Additional information on the status of this project is available in *Chapter 3, Airport Planning*.

Preliminary work was completed for the Future Phase. However, further work on the Future Phase is not expected until after 2010. Table 9-4 lists each mitigation measure for the International Gateway Project in the Section 61 Findings along with Massport's progress in achieving these measures through the end of 2007.

Figure 9-3 International Gateway Project



Note: Runway 14-32 construction completed in November, 2006.

Table 9-4 International Gateway Project Status Report (EOEA #9791) Section 61 Mitigation Measures (as of December 31, 2007)

Mitigation Measure	Status
4.1 Project Design Measures	
Green Technology	
A variety of energy conserving and nonpolluting building materials, systems and equipment will be incorporated into the Project. These include the use of water-saving and flow-reducing devices, high-efficiency motors in the HVAC systems, energy-saving lighting, clearstories to maximize natural lighting, super-insulated walks and ceilings, and low E glass windows to further reduce heat load.	Implemented. The energy efficient requirements were included in the project design specifications and contract plans. Future phases will include green technology in their design specifications.
Public Art Projects	
An arts and culture program is being developed which will include themes of Boston as part of the international community, as an important cultural center, and as a gateway to New England and the United States.	Implemented. Includes public art in the ticketing hall and elevated pedestrian walkways.

Table 9-4 International Gateway Project Status Report (EOEA #9791) Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Sculptures depicting New England culture will be installed in the facility.	Implemented. Artist-designed terrazzo floors have been installed in the elevated pedestrian walkways to the Central Garage. The walkways to Terminal E were complete in 1998.
400-Hz Power and Pre-conditioned Air	
With the Project, gate power for the aircraft will be provided directly from a central facility, with aircraft preconditioned air provided from "point-of-use" systems at the gate.	Implemented. Replacement or reconstruction of the terminal jet bridges has been completed. 400-Hz power and pre- conditioned air systems have been installed at the gates.
Alternative Fuel Outreach Program	
Massport is working cooperatively with the EPA and regional utility providers in coordinating an ongoing outreach program aimed at promoting the use of clean-burning alternative fuels. This program, which is also supported by fuel providers, vendors, and state and federal agencies, will offer information to airport tenants in the following areas: ■ *Notification of grant programs or other financial incentives for vehicle conversions.* ■ *Assistance in cost-benefit analysis for conversion of conventionally fueled vehicles to AFVs.* ■ *Assistance in placing airport tenants in contact with alternative fuel suppliers and product vendors.*	Implemented. Massport continues to work cooperatively with National Grid, AVSG, the City of Boston, and the Massachusetts Clean Cities Coalition to promote the implementation and integration of Alternative Fuel Vehicles into local private and public fleets. In May 2007, Massport adopted two new policies to promote alternative fuel and hybrid vehicle usage at Logan Airport by others: 1) limited front-of-line taxi pool privileges; and 2) preferred Parking locations in the Central Garage and satellite locations. In addition, Massport has been a sponsor and exhibitor at Altwheels, a sustainable transportation festival and seminar for fleet managers since its inception in 2003.
Bi-level Terminal Roadway and Curbside	
The Project will have a bi-level terminal roadway system.	Implemented. The viaducts connecting Terminal E to the new elevated enplaning roadway and the remainder of the enplaning and deplaning viaducts and roadway systems were completed and opened in May 2003.
Terminal curbs will be designed to promote and enhance the use of HOVs. Curbside areas earmarked for HOV use will be covered by a canopy and waiting structures on the curbside will provide additional protection from the weather.	Implemented. Construction of the terminal curbs and canopies was completed in December 2003.
Massport will periodically review its current policy, which assigns HOVs to the curb closest to the terminal.	Implemented. HOV access has been incorporated into the final design. Massport assigns HOV buses to the far end of the inner curb, near the exit from the terminal. As a result of analyses for Terminal E and the associated curb layout and traffic flows (conducted in 2002), smaller shuttle buses are now directed to the outer curb.
HOV Promotion	
Massport will reserve terminal space for ground transportation ticket sales, reservations, and information.	Implemented. This space has been provided in a staffed information area in the arrivals area of the new terminal. In a joint venture with MBTA new Charlie Card automated fare collection equipment was installed in all Logan Airport terminals in 2006.

Table 9-4 International Gateway Project Status Report (EOEA #9791) Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Attractive and distinctive signage and graphics will be utilized inside the terminal and out at the curb to clearly mark access to Logan Express, MBTA, water transportation, and other HOV options.	Implemented. Signage has been installed in the terminal and at the curbside.
As HOV services continue to develop and expand at Terminal E, Massport will expand its web page to encompass these new services and initiatives.	Implemented. Massport continues to reflect service changes on its website.
Massport and the MBTA will offer, on a trial basis, the sale of MBTA tokens via a vending machine in the baggage claim area of Terminal C.	Implemented. The Logan TMA sells MBTA passes. The MBTA Charlie Card machines (which replaced tokens) are located at the MBTA's new Blue Line Airport Station and Massport continues free service to the station with its CNG bus fleet. As part of an Interagency Agreement with MBTA for operations and maintenance of MBTA Silver Line service to Logan Airport, the two transportation agencies installed the MBTA's new automated fare collection (AFC) equipment in the Logan Airport terminals in 2006.
Connections to the West Garage	
The Project will be designed to allow pedestrian access to the new West Garage via an overhead walkway with moving sidewalks.	Implemented. Walkways to Terminals A and E and opened concurrent with the opening of the West Garage in September 1998.
Connections to Future Airport Intermodal Transit Connector (AITC)	
The Project is being designed with the flexibility to accommodate access to a possible future AITC station planned adjacent to the terminal.	Implemented. The project design includes this flexibility. The new Silver Line Airport Service includes a stop at Terminal E.
4.2 Construction Period Mitigation	
Traffic Operations Mitigation	
Specific traffic mitigation measures to be employed will include, but not necessarily be limited to, the following: Maintaining full use of the roadways; requiring ingress and egress; requiring acceleration and deceleration lanes; prohibiting on-Airport contractor employee parking; encouraging the use of alternative modes of travel; and requiring police details.	Implemented. Measures to control traffic operations and mitigation of construction equipment were in contract specifications and will continue to be enforced during construction of future phases.
Noise Mitigation	
Noise control techniques will be used to reduce noise from pile driving by at least 5 dBA below unmitigated levels. These techniques include such measures as: Measures to minimize noise attributable to pile driving; use of concrete crushers; use of local grid power; mufflers, shields or shrouds on construction vehicles; noise-deadening material; equipment maintenance; limiting idling, public address systems; limiting air or gasoline driven hand tools; optimal site configuration; and efficient scheduling of truck loading, unloading and hauling operations to minimize noise.	Implemented. Restrictions on construction-related noise were included in the contract specifications, and will continue to be enforced during construction of future phases.

Table 9-4 International Gateway Project Status Report (EOEA #9791) Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Air Quality Mitigation	
Included measures such as performing regular street sweeping; suppressing water spray dust; fencing the perimeters of demolition and construction areas; and covering the trucks.	Implemented. Measures to reduce air quality impacts during construction were included in the contract specifications and will continue to be enforced during construction of future phases.
Overall Project Construction Mitigation	
Massport has hired a construction management (CM) firm which is responsible for overseeing all activities related to the Project. The CM will be responsible for ensuring that the following practices are carried out and adhered to:	Implemented. These measures will be implemented throughout construction.
Full agency coordination; preparation of detailed preconstruction plans; generally limited hours of work; list of construction do's and don'ts; transportation management plan; fugitive dust control; preconstruction environmental characterization of soils and groundwater; soils management plan; site-specific Stormwater Pollution Prevention Plan; Health and Safety Plan; encouraging the use of recycled building materials.	
Rodent Control	
During the construction process, regular service visits will be made in order to maintain effective rodent control.	Implemented. Measures to control the rodent population were included in contract specifications and are implemented as needed.
Agency and Community Coordination	
On-site personnel and equipment; maintaining and monitoring the Logan 2000 community response telephone line; participation in an interagency planning/ construction coordination task force; specific construction related performance standards; continuing to meet with the community to provide a forum for addressing community concerns that arise during construction; publication of periodic newsletters advising the public as to the status of the project.	Implemented. Massport regularly meets with interested community groups and provides updates as requested.

Note: Text in italics detailing the mitigation measures is excerpted from the Section 61 Findings submitted to the EOEA, June 26, 1997.

Replacement Terminal A Project – EOEA #12096

Permitting History

- Certificate on the Final EIR issued on November 16, 2000
- Section 61 Findings submitted to EOEA August 31, 2001

Project Status

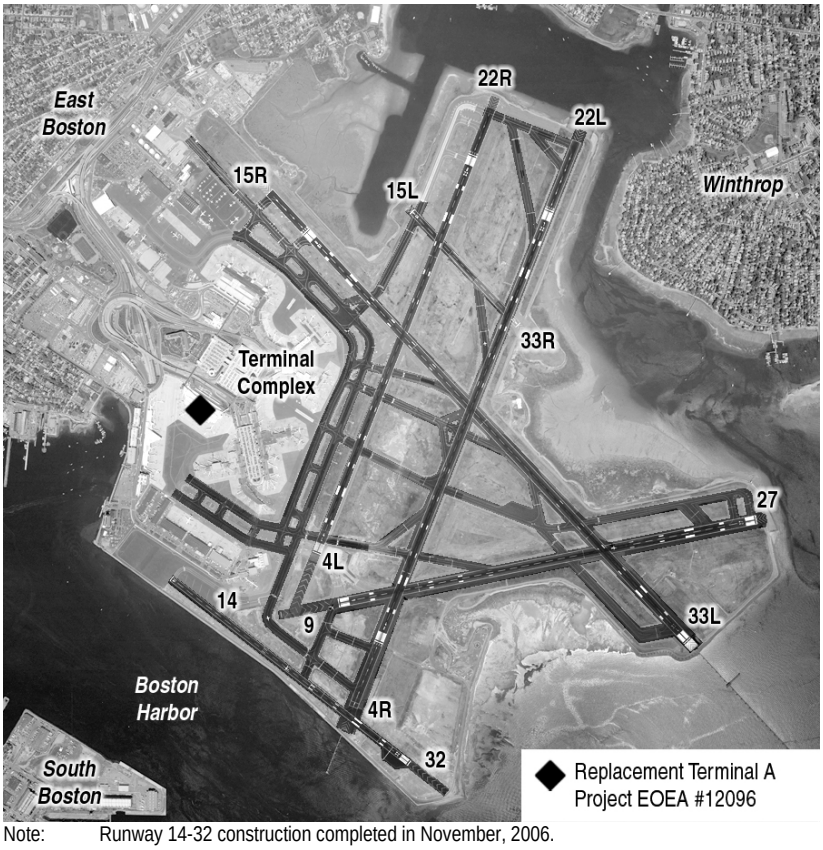
The Replacement Terminal A Project (Figure 9-4) involved the complete demolition of the pre-existing Terminal A and construction of a new facility by Delta Air Lines, consisting of a main terminal linked to a satellite concourse. The old Terminal A was closed in May 2002 and demolition commenced shortly thereafter. The project was designed to be constructed in five phases. However, as a result of September 11, 2001, air traffic at Logan Airport reduced dramatically allowing Massport to relocate the airlines at Terminal A to other terminals with minimal impact, and to shut down Terminal A entirely rather than having to phase construction concurrent with passenger activity. As a result, construction progressed ahead of schedule in 2003 and 2004. Terminal A opened on March 16, 2005.

In the spring of 2006, Delta Air Lines and Massport submitted an application for certification of Terminal A under the U.S. Green Building Council Leadership in Energy and Environmental Design® (LEED) Green Building Rating System™. LEED certification was awarded in June 2006, making Terminal A the first airport terminal in the U.S. to be awarded LEED certification.

The following sustainable elements were incorporated into the design of Terminal A:

- Water conservation — low-flow toilets, waterless urinals, and drip rather than spray irrigation.
- Atmosphere protection — zero use of chlorofluorocarbon (CFC)-based, hydrochlorofluorocarbon (HCFC) based, or halon refrigerants.
- Energy conservation — special roofing and paving materials that reflect solar radiation.
- Materials and resources conservation — more than 10 percent of all the building materials used to construct the terminal were from recycled materials.
- Enhanced indoor environmental air quality — low and volatile organic compound (VOC) free adhesives, sealants, paints, and carpets were used, and smoking is prohibited inside the terminal building.
- Sustainable sites — bicycle racks were installed in proximity to bus and subway systems.

Figure 9-4 Replacement Terminal A Project



Note: Runway 14-32 construction completed in November, 2006.

Table 9-5 lists each mitigation measure in the Section 61 Findings along with Massport's progress in achieving these measures through the end of 2006.

Table 9-5 Replacement Terminal A Project Status Report (EOEA #12096) Section 61 Mitigation Measures (as of December 31, 2007)

Mitigation Measure	Status
Project Design Mitigation	
Green Technology	
The Terminal A Replacement Project will incorporate elements of sustainable design, including state-of-the-art green technologies to conserve energy and minimize pollution during construction and operation of the facility. This will be guided by the LEED® Green Building Rating System™.	Implemented. The Replacement Terminal A incorporates various green technologies, including use of non-toxic, recycled and renewable materials; master lighting control systems; photosensors; windows that maximize natural lighting; low E glass that reduces heat load; use of local materials for at least 20 percent of non-mechanical building materials; adhesives and sealants that have no or low VOCs; and water saving fixtures.
Delta will apply to LEED Certification of Terminal A and will use diligent efforts to obtain this certification. Through its design process Delta will report to Massport periodically about its progress in obtaining LEED certification.	Implemented. Delta Air Lines and Massport achieved LEED Certification of Terminal A and that commitment is reflected in the Lease Agreement between Massport and Delta Air Lines. The application was submitted during the spring of 2006 and LEED certification was awarded in June 2006.
Urban Design of Replacement Terminal	
Design the new terminal to attenuate noise and to fit in with the visual character of the surrounding area. Incorporate landscaping into the design.	Implemented. These requirements and considerations were taken into account during design. The satellite terminal acts as a sound barrier to Jeffries Point.
400-MHz Power and Preconditioned Air	
The Terminal A Replacement Project will provide gate power for the aircraft directly from a central facility, with aircraft preconditioned air provided from "point-of-use" systems at the gate.	Implemented. "Point-of-use" systems have been installed.
Logan TMA Participation	
Delta Air Lines, Inc. has joined Massport's Logan TMA. Delta will designate an Employee Transportation Advisor at Terminal A to be the conduit between the Logan TMA Coordinator and Delta employees.	Implemented. Delta Air Lines joined the Logan TMA and designated an Employee Transportation Advisor.
Additionally, Delta will provide the following services as part of their Transportation Demand Management Program through the Logan TMA Transportation subsidy for full-time Delta employees at Logan Airport; ride matching/carpooling; vanpooling; guaranteed ride home; preferential parking for HOVs; shuttle to and from employee parking.	Implemented. TDM services are provided through the Logan TMA.

Table 9-5 Replacement Terminal A Project Status Report (EOEA #12096) Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Recycling Program	
The Replacement Terminal A will be included in within Massport's terminal recycling program.	Implemented. Paper, plastic, aluminum, glass and cardboard are recycled at Terminal A.
High Occupancy Vehicle Promotion	
HOV access can be accommodated on the departures level and will be designated near main entrances to the terminal building to ensure efficient and convenient unloading by air passengers who use these mode-types to access the Airport.	Implemented. HOV access has been incorporated into the final design. HOV lanes give HOV modes preferential access to Terminal A for passenger convenience at both the arrival and departure levels.
The inner-most curb of [the arrivals level] will be designated exclusively for HOVs and taxis, similar to the departures level.	The Airport Silver Line service has a dedicated stop at Terminal A on the inner-most curb.
Ground Service Equipment (GSE) Conversion	
In conjunction with the Project, Delta will implement a program for conversion of its entire GSE fleet at Terminal A as soon as viable alternative fueled fleet vehicles become available and can be effectively integrated into Delta's operations at Terminal A.	Pending Implementation.
Delta will introduce battery powered baggage tugs and belt loaders with the replacement terminal and convert this portion of the GSE fleet by the end of 2008. This represents over 40 percent of Delta's current GSE fleet.	Pending Implementation. The Terminal A design incorporates infrastructure for GSE charging. Full replacement is scheduled for completion by 2009.
Delta will also examine the feasibility of locating a Compressed Natural Gas (CNG) fill station at Terminal A. The availability of a CNG fueling station would facilitate conventionally-fueled vehicles to be replaced with CNG-fueled vehicles where this vehicle option is offered. Delta will introduce these vehicles into its GSE fleet as soon as they become available and are determined to be feasible and practicable for use at Terminal A.	Implemented. Delta Air Lines examined the feasibility of locating the CNG fill station at Terminal A and determined it to be infeasible given that the GSE conversions are trending toward electric vehicles. A CNG fuel facility is available on the Airport.
Where new AFVs are developed and determined to be cost effective and in available supplies, Delta will integrate their use into its Terminal A GSE fleet operations.	Implemented. Delta Air Lines has committed to electric baggage tugs and belt loaders and will continue to determine the feasibility of integrating other alternative fuel GSE.
Finally, Delta will provide Massport with an annual status report/update on the GSE conversion program at Terminal A, for inclusion in Massport's annual ESPR.	Implemented. Terminal A includes electric charging stations for Delta Air Lines' electric ramp vehicles. Delta Air Lines is studying which AFVs and infrastructure are best suited for its future GSE operations. Delta Air Lines will provide Massport with an annual status report on the GSE conversion program at Terminal A.

Table 9-5 Replacement Terminal A Project Status Report (EOEA #12096) Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Pedestrians traveling between the West and Central Garages will be provided with enclosed elevated walkway connections between the terminal and the two parking garages. The walkways will be designed with features such as climate controls and other design features that will allow for safe and comfortable passage between the terminal and garage structures.	Implemented. Terminal A includes two enclosed connections to the existing Airport-wide pedestrian bridge system. There is a new bridge at the west end of the ticketing hall that reestablishes the connection to the pedestrian bridge to the West Garage and the Hilton Hotel. At the east end of the ticketing hall, a new bridge connects to the existing walkway between the Central Garage and Terminal B.
Pedestrian connections will be improved by the following measures: connections to elevated walkways, improved crosswalks, surface walks.	Implemented. These measures have been incorporated in the final design and include the connections to the garages and Terminal B as described above. The Arrivals level roadway design includes three crosswalks that are aligned symmetrically with the terminal exit vestibules. The project provides a new sidewalk along Harborside Drive.
Operational Mitigation Measures	
Minimizing nighttime movement of aircraft to and from hardstand positions.	Implemented. In 2007, Delta Air Lines parked all aircraft at gates.
Using single engine taxiing and pushback to the extent feasible and practicable, recognizing that such use always at the discretion of the pilot in charge of the aircraft based upon his or her experience and safety and operational considerations.	Implemented. This measure is being implemented. In August 2006, Massport sent letters to all airlines operating at Logan Airport encouraging the voluntary use of single-engine taxiing, consistent with safety requirements, pilot judgment and the requirements of federal laws.
Testing alternative de-icing methods to reduce the amount of glycol usage.	Implemented. Delta Air Lines will continue to investigate de-icing alternatives.
Construction Period Mitigation	
Construction period mitigation will be incorporated into the contract documents and specifications governing the contractors and subcontractors constructing the Terminal A Replacement Project.	Implemented. Construction period mitigation requirements were in the contract specifications and were enforced during construction.
Massport and Delta will employ a team of on-site resident engineers and inspectors to monitor contractors' compliance with all mitigation measures. These measures may be adjusted, as appropriate, to assure continued effectiveness in supporting Massport's construction period mitigation objectives.	Implemented. Construction period mitigation requirements were in the contract specifications and were enforced during construction.
Specific construction period mitigation is described below: Traffic Mitigation, Noise Mitigation, Air Quality Protection, Overall Project Construction Mitigation, Rodent Control.[1]	Implemented. Construction period mitigation requirements were in the contract specifications and were enforced during construction.

Note: Text in italics detailing the mitigation measures is excerpted from the Section 61 Findings submitted to the EOEA, August 31, 2001.
1 Details are available in the Section 61 Findings.

Logan Airside Improvements Planning Project – EOEA #10458

Permitting History

- Certificate on the Final EIR issued on June 15, 2001.
- Section 61 Findings dated June 8, 2001 on the Final EIR.
- In June 2002, the FAA filed a Final Environmental Impact Statement (FEIS) and issued the ROD in August 2002 approving a unidirectional runway and other improvements, but deferred a decision on the centerfield taxiway pending additional review by the FAA.
- In November 2003, the Superior Court of the Commonwealth modified a 1976 injunction prohibiting construction of a new runway at Logan Airport, pending further environmental review. The injunction modification allowed construction of the runway in accordance with the MEPA Certificate on the Final EIR and the FAA's ROD on the Final EIS.
- In accordance with the Secretary's Certificate on the Final EIR, Massport amended its final Section 61 Findings issued in 2001 to incorporate mitigation measures added or refined through the federal environmental review process. As a result, Massport amended its initial Section 61 Findings on October 21, 2004 to include mitigation measures required of it in the FAA's ROD.
- In April 2007, the FAA issued a ROD on the centerfield taxiway improvements based on its review of supplemental information.

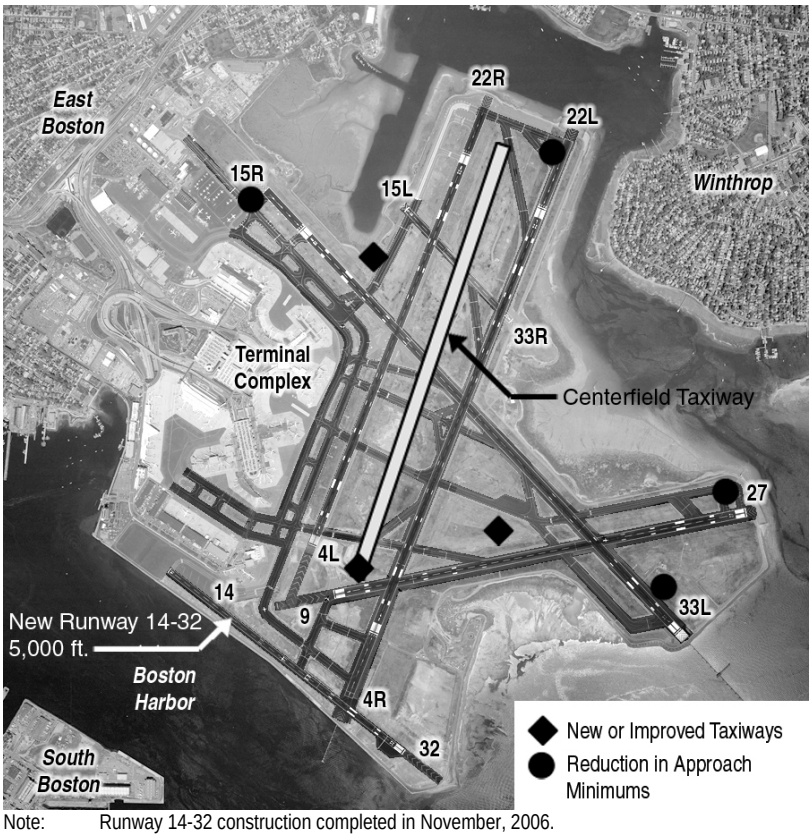
Project Status

- Project construction commenced in 2004. Runway 14-32 opened on November 23, 2006. 2007 was the first full year of operation of Runway 14-32.
- Construction of Taxiway Improvements commenced in the fall of 2007.
- Realignment of the southwest corner of Taxiway D was completed in 2007.

The Logan Airside Improvements Planning Project (Figure 9-5) involves the construction of a new unidirectional Runway 14-32 and centerfield taxiway, extension of Taxiway D, realignment of Taxiway N, improvements to the southwest corner taxiway system, and reduction in approach minimums on Runways 22L, 27, 15R, and 33L. Reduction in approach minimums on Runway 15R and 33L were approved in the EIS. However, implementation depends upon realignment of the Instrument Landing System (ILS) localizer. Relocation of the ILS localizer is awaiting completion of the environmental review of the Runway Safety Area enhancements for Runway 33L.

Table 9-6 summarizes the mitigation measures contained in the amended Section 61 Findings issued on October 21, 2004 and reports on the status of implementation.

Figure 9-5 Logan Airside Improvements



Note: Runway 14-32 construction completed in November, 2006.

**Table 9-6 Logan Airside Improvements Planning Project (EOEA #10458)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007)**

Mitigation Measure	Status
Project Design and Mitigation Measures	
Runway 14-32 Operations and Construction Mitigation Operational procedures for unidirectional Runway 14-32 will include over water flight operations only, arrival operations in east-to-west direction from Runway 32 approach end, and departure operations from west-to-east direction from the Runway 14 departure end. Massport will enter into contract with appropriate government body and/or community group(s) to enforce intended unidirectional runway, if requested. Lighting, marking, and instrumental components of Runway 14/32 will be designed for a unidirectional runway. No parallel or other type taxiway facility will be constructed to allow east-to-west direction departures from the Runway 32 end. *FAA endorsed the unidirectional limitations on Runway 14-32 and has agreed to develop air traffic control procedures to ensure safe and efficient operation of the unidirectional limitation, subject to variances that may be required to accommodate particular aircraft emergencies.*	Implemented. Runway 14-32 was constructed for unidirectional operation. All lighting, marking and navigational instrumentation was constructed and is operated for unidirectional use only. There is no parallel or other type of taxiway facility that would facilitate east-to-west direction departures from the Runway 32 end. The construction mitigation measures were incorporated into the final design specifications and were implemented during construction. Runway 14-32 opened on November 23, 2006. 2007 was the first full year of operation of Runway 14-32.

Table 9-6 Logan Airside Improvements Planning Project (EOEA #10458) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Wind-Restricted Use of Runway 14-32	
Restrict the use of Runway 14-32 to those times when winds are equal to or greater than 10 knots from the northwest or southeast (between 275 degrees and 005 degrees, or 095 degrees and 185 degrees, respectively).	Implemented. Massport compiles the necessary data and cooperates with FAA to facilitate its effort to implement the wind restriction in compliance with the federal ROD.
Mitigation Policies/Programs	
Regional Transportation Policy	
Engage in promoting increased utilization of regional airports *Cooperative transportation planning with the various transportation agencies to ensure an integrated regional transportation infrastructure, i.e., improved highways, public transportation, high-speed rail, private transportation services to improve regional airport access.*	Implemented. During 2001, Massport, together with the FAA and the six New England Regional State Aviation Directors developed a scope of work and selected a technical team to undertake the New England Regional Aviation System Plan (NERASP) Update study. In 2002, the Massport Board approved 10 percent funding with a 90 percent federal match toward the $1.6 million study.
Massport will continue to exercise operational control over Worcester Regional Airport.	Implemented. The Authority continues to exercise operational control over Worcester Regional Airport as part of Massport's agreement with the City of Worcester which went into effect on January 15, 2000. In April 2004, Massport and the City of Worcester agreed to a three-year extension of the Operating Agreement, extending Massport's operation of the Logan Airport through June 2007. Subsequently, both parties have agreed to a further extension to December 2007.
Massport will continue to attract new air service to Worcester Regional Airport.	Implemented. Following the events of September 11, 2001, the last commercial operator, US Airways Express, ceased operations out of Worcester in early 2003. In 2003 and 2004, Massport continued to work with the City to attract passenger service for the Worcester Regional Airport. New service by Allegiant Airways commenced in December 2005 but ceased in September 2006.
Traveler and air service awareness will be provided to Worcester Regional Airport via marketing campaigns.	Implemented. In 2001, the Massport Board approved $300,000 for the promotion of the Worcester Regional Airport. The marketing campaign consisted of radio, print, the internet (travel agents), outdoor and "out of home/mall" advertising. The advertising campaign was suspended due to the financial impacts of September 11, 2001. It was resumed and again suspended for a second time due to the lack of commercial service.
Develop and maintain an aviation information database to include: aviation trend tracking reports for distribution to interested parties; statistical summaries of passenger levels, aircraft operations and airline schedule data at major New England regional airports; include a summary of regional airport trends and service developments an Annual Report.	Implemented. Massport collects regional airport data. A detailed summary of individual airport activity is published annually in the EDRs. Massport was also the prime contractor for the NERASP.

Table 9-6 Logan Airside Improvements Planning Project (EOEA #10458) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Participate in other regional/state aviation forums.	Implemented. The NERASP study was completed in the fall of 2006. It can be found on the website noted on the previous page. Massport continues to participate in regional and state aviation forums as they exist.
Continue to work with FAA/regional airport directors to complete a New England Airports System Study to evaluate regional airports performance. FAA committed to work with other participants in the preparation of the study.	Implemented. The NERASP Study was published in October 2006.
Encourage transportation initiatives (i.e., commuter rail, rail or other links between regional airports) by relevant agencies or other governmental bodies through Transportation Bond Bill or other legislative initiatives to implement an improved effective regional transportation system.	Implemented. Massport transportation initiatives include support for legislation at the local, state, and federal levels. Massport continues to provide support for regional transportation legislation and funding for other modes of transportation including the MBTA Silver Line, water transportation. Massport's continued support was instrumental in the 2001 opening of the Anderson Regional Transportation Center (RTC) in Woburn which provides a station building for ticketing, baggage and passenger services, approximately 2,400 parking spaces for daily and overnight parking, loading platforms for Logan Express and local buses, improved access from I-93 via a new interchange constructed and opened by MassHighway, and a new high-level platform commuter rail station.
Continue to assist in the development of a comprehensive rail plan for New England.	Implemented. Past examples of Massport's assistance in development of a rail plan for New England: In 2001, the Executive Office of Transportation and Construction (EOTC), the New Hampshire Department of Transportation (DOT) and the Vermont DOT hired a consultant team to perform a feasibility study for high-speed rail from Boston to Montreal. In addition to automobile, bus and rail travel surveys, Massport facilitated the consultant team's passenger survey at Logan Airport to identify modes of travel to the Airport.
Continue to support inter-city rail planning through the Boston Metropolitan Planning Organization (MPO).	Implemented. Massport continues to participate in the Boston MPO and contributes to the policy discussions in all modes of transportation.
Allow Massport's Logan Express satellite parking lots and stations available for third-party bus and park-and-ride connections to other regional airports, including Worcester, Manchester, and Providence.	Implemented. Upon request and review, Massport will continue to allow third party bus operators to provide service to regional airports from Logan Express facilities. In 2007, Massport enacted an agreement with Manchester-Boston Regional Airport to allow operation of a new shuttle service between Manchester-Boston Regional Airport and the RTC in Woburn.

**Table 9-6 Logan Airside Improvements Planning Project (EOEA #10458)
Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)**

Mitigation Measure	Status
Residential Sound Insulation (RSIP)	
Sound insulation will be provided in the newly defined 1999 contour that will include affected residences in Chelsea, East Boston, and South Boston. Through special project mitigations, FAA funding will be provided for residences with building code considerations to allow for the necessary upgrades thereby ensuring eligibility and participation in the sound insulation program. If FAA funding is unavailable to complete sound insulation to residences within the new 65 db DNL contour as a result of project implementation, Massport will provide the funding. See *Chapter 6, Noise Abatement* for additional details on RSIP.	Implemented. The RSIP is being implemented in full compliance with state and federal regulatory requirements and mitigation commitments.
The FAA has committed to provide funding for a Massport sound insulation program to address noise exposure within the 65 DNL contour that results from the implementation of the EIS Preferred Alternative for the Project as mitigated by the 10-knot wind restriction. In the event Federal funding is not available, Massport reiterates its commitment to provide funding for eligible homes. FAA also has agreed to fund building code upgrades to the extent necessary for sound insulation.	
Tenant Relocation Assistance	
Construction of Runway 14-32 will result in the demolition of Cargo Buildings 60 and 61. Massport will provide assistance to eligible tenants in Building 60. The tenant of Building 61 will vacate.	Implemented. The tenant in Building 61 vacated the premises upon expiration of its lease. Massport provided relocation assistance to the eligible businesses in Building 60.
FAA has committed to ensure that Massport's tenant relocation program is followed through appropriate conditions in federal grants. Massport will continue to comply with its commitments with respect to tenant relocation.	
Vegetation	
Sediment and erosion controls will be implemented within the 100-foot buffer zone of the coastal bank.	Implemented. Sediment and erosion controls were installed prior to construction and have been maintained while disturbed areas stabilize.
Areas disturbed by construction will be stabilized with vegetation common to airfield once re-grading is completed.	Implemented. Massport will stabilize the areas disturbed by construction once re-grading is completed.
Wildlife	
Alter existing airfield grassland mowing procedures prior to spring arrival of upland sandpiper to encourage occupation in other airfield areas other than the construction area implement a pre-construction upland sandpiper inspection program and conduct on-going pre-mowing to ensure no individual birds remain in the area, and encourage off-site habitat due to airfield safety.	Implemented. Massport will proceed with these measures as the improvements are implemented.

Table 9-6 Logan Airside Improvements Planning Project (EOEA #10458) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Water Resources	
The existing storm-water drainage system will be reconfigured and a low-flow water quality treatment structure will be incorporated, if feasible.	Implemented. Massport incorporated these design specifications as part of the project's construction plan. Two water quality treatment structures have been integrated into the final design of the project.
FAA has reiterated the provisions of Section 7.0 of the Section 61 Findings and has committed to ensure compliance with these requirements and water quality Best Management Practices (BMPs) through its engineering oversight of the Project.	Implemented. Project design incorporates water quality elements and BMPs as described in the Final EIR. BMPs were implemented during project construction and operation of the runway. Similar measures are being implemented during centerfield taxiway construction.
Preferential Runway Advisory System (PRAS)	
Massport will develop and implement a PRAS monitoring system and a new distribution system for reporting that will expand the contents of Massport's Quarterly Noise Reports and will involve the expansion of the distribution list to include the Logan Airport Citizens Advisory Committee (CAC). Runway utilization, dwell and persistence reports will be included in the ESPR filings with MEPA. Massport will continue to work with FAA to design additional reports to enhance the attainment of PRAS and Massport will begin to work with CAC to update PRAS. The current PRAS system will remain in place until superseded.	Implemented. Massport, FAA, and the CAC initiated a noise study of Logan Airport. PRAS review and reporting are incorporated into the requested noise study. Runway utilization, dwell and persistence reports continue to be included in ESPR and EDR filings with MEPA.
Noise Abatement Study	
FAA has committed to undertake a noise abatement study that will include enhancing existing or developing new noise abatement measures applicable to aircraft overflight impacts, which will take into account environmental benefit, operational impact, aviation safety and efficiency, and consistency with applicable legal requirements. The scope of this study has been completed through the joint efforts of FAA, the CAC, and Massport as required by the ROD. Massport will work with the CAC and FAA to assess the existing PRAS at Logan Airport in accordance with Section 10.0 of the Section 61 Findings and will continue to participate in the noise study as contemplated in the ROD.	Implemented. The FAA, in conjunction with Massport and the Logan Airport CAC, initiated the Boston Overflight Noise Study. Phase 1 of the study, completed in early 2007, defined and will seek to implement changes to flight tracks to minimize impacts from aircraft overflights which do not require a detailed EA. Phase 2, now underway, will address additional noise abatement alternatives that will require detailed analysis to meet FAA environmental requirements. Federal funding for Phase 2 was requested early to ensure seamless continuation of the study and transition.
Peak Period Monitoring and Demand Management Program (DMP)	
Massport will develop and implement a Peak Period Pricing (PPP) program or an alternative DMP. Massport will identify standards to allow airlines to accurately predict scheduling costs and modify accordingly. Massport will establish and maintain a monitoring system. *Massport will comply with its commitments with respect to PPP or alternate DMP. FAA has indicated in the ROD that it stands ready to assist Massport in this endeavor.*	Implemented. In July 2004, Massport filed a proposed rule with the Office of the Massachusetts Secretary of State to formally initiate the state rulemaking process and public review of a proposed rule to establish a peak period surcharge during designated peak delay periods at Logan Airport. The filing was followed by a public comment period that lasted through November 15, 2004. During the comment period, Massport conducted two public hearings to receive comments on the proposed regulation. The Massport Board voted to establish the peak period surcharge program on January 16, 2005. The program has been in place since that date. *Appendix K, 2007 Peak Period Pricing Monitoring Report* includes a copy of Massport's Peak Period Pricing Monitoring Report for 2007.

Table 9-6 Logan Airside Improvements Planning Project (EOEA #10458) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Single-Engine Taxi Procedures	
Develop and implement a program designed to maximize the use of single-engine procedures by all tenant airlines, consistent with safety requirements, pilot judgment and Federal law requirements.	Implemented. In 2006, the Massport Director of Aviation sent letters to all airlines operating at Logan Airport encouraging the use of reduced engine taxiing consistent with safety, pilot judgment, and federal laws.
General Construction Mitigation	
Traffic Mitigation	
Construction vehicles will use the Airport roadway system/State highways and be restricted from using Neptune Road, Maverick Street and Porter Street in East Boston. Construction employees (with the exception of some supervisory personnel) will be prohibited from on-site/on-Airport parking and will access the Airport via public transportation or shuttle service from designated off-site parking. Police details will be employed to ensure safety and to manage traffic at appropriate locations.	Implemented. Construction mitigation measures and practices were and will be maintained during construction.
Air Quality Mitigation	
Require contractors to retrofit heavy construction equipment with advanced pollution control devices. Control dust by: street sweeping; applying water as needed and covering trucks hauling demolition and excavation site materials.	Implemented. Construction mitigation measures and practices were and will be maintained during construction.
Noise Mitigation	
Noise Control Techniques include the use of concrete crushers; use of local power grid to reduce generator use; attaching of intake and exhaust mufflers, shields or shrouds; use of noise deadening material to inside of hoppers, conveyor transport points, or chutes; ongoing equipment maintenance to ensure peak performance; limit equipment idling; limit use of public address systems/annunciators; limit use of gasoline driven hand tools; configure, where feasible, the construction site will be as far from noise-sensitive locations as possible. Nighttime construction schedule noise measures will be implemented including: prohibit, to appropriate extent, back-up alarms for all equipment; provide additional construction laborers to ensure backup safety and to comply with OSHA regulations; prohibit delivery trucks from tailgate slamming during paving operations; require contractors to turn off vibratory compactors prior to exiting off newly placed pavement and onto old existing pavement.	Implemented. Construction mitigation measures and practices were and will be maintained during construction.
Overall Construction Mitigation Monitoring	
Pre-construction Plans	
Develop a HASP, a site-specific Construction Stormwater Prevention Plan , a site Soil Management Plan, adopt Massachusetts Clean Air Construction Initiatives, develop Construction Employee Transportation Management Plan, develop detailed traffic maintenance plans, and develop construct specifications and standards for all contractors.	Implemented. Pre-construction plans were developed prior to commencement of construction in 2004.

Table 9-6 Logan Airside Improvements Planning Project (EOEA #10458) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2007) (Continued)

Mitigation Measure	Status
Preferred Alternative Site Control/Security	
Conduct full agency coordination with the FAA, MBTA, MTA, MA DEP, CZM, MWRA, BWSC and utility companies. Established an on-site team of resident engineers and inspectors.	Implemented.
Report on Progress of Logan TMA	Implemented. *Chapter 5, Ground Transportation* of the *2007 EDR* discusses the current status of the Logan TMA and ongoing efforts to increase Logan TMA membership and overall HOV access to Logan Airport. Since MassRIDES began management of the Logan TMA in January 2006, the joint focus has been on expanding Logan TMA services, broadening HOV options, and working to see that all major Logan Airport tenants become members and actively participate in the Logan TMA. In 2007, the Logan TMA implemented three new programs: 1) Sunrise Shuttles; 2) Logan TMA Preferential Carpooling; and 3) Commuter Cash program. In 2007, Logan TMA membership increased by 1,632 employees (representing a 161.7 percent increase since 2006).

Note: The mitigation measures in italics are those that were referenced in the FAA's ROD and later incorporated into the October 21, 2004 amended Section 61 Findings.

A

MEPA Certificate and Responses

- Secretary of the Executive Office of Energy and Environmental Affairs Certificate on the *Logan Airport 2006 Environmental Data Report (2006 EDR)* and Massport's Responses to Comments raised in the Certificate.
- Copies of the Secretary's Certificates issued for the reporting years 2004 and 2005.

Secretary of the Executive Office of Energy and Environmental Affairs Certificate on *2006 EDR* and Massport's Responses to Comments Raised in the Certificate

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November 1, 2007

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
2006 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME	: 2006 Environmental Data Report
PROJECT MUNICIPALITY	: Boston / Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: September 25, 2007

As Secretary of Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00).

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long range plans. It has thus become (consistent with the objectives of the MEPA regulations) part of Massport's long range planning. In recognition of the increased role of planning in the GEIR process, the name of the document was changed to ESPR. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific EIRs. The ESPR is currently updated on a 5-year basis, with much less detailed Environmental Data

Reports (formerly Annual Updates) filed in the years between ESPRs. The 2006 EDR is the subject of this Certificate.

In general, the EDR has fulfilled its purpose of providing a "snapshot" of year 2006 passenger and impact levels at Logan Airport. Most environmental parameters showed improvement in calendar year 2006. In particular, the technical studies in the 2006 EDR included reporting on and analysis of key indicators of airport activity levels, airport planning, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. Mitigation of noise impacts and air quality remain key concerns both of this office and the commenters. These commitments take the form of project-specific Section 61 Findings, as well as more general mitigation that has emerged from the ESPR process.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the *1997 Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

Review of the 2006 EDR

As always, EEA remains committed to evaluating and addressing the cumulative impacts of airport operations on the nearby communities. In June 2001, Massport agreed to work with EEA on structuring a proposed Air Quality Initiative (AQI). The Certificate indicated that Massport was "to solicit project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." The 2006 EDR reiterates that Massport has committed to the Air Quality Initiative, a key program designed to mitigate the cumulative air quality impacts of airport operations. The 2006 EDR details how Massport is meeting this commitment. The 2007 EDR should continue to report on the details of Massport's commitment and address the concerns raised by the City of Boston's Environment Department on this issue. In addition to the environmental issues listed below, the 2007 EDR should address all of the air quality and noise related issues raised by the commenters during the review of the 2006 EDR.

M-001-001

Procedural

Given the overall strength of the analysis in the 2006 EDR, the 2007 EDR can restrict itself to providing an update on 2007 conditions, and respond to those issues explicitly noted in this

M-001-001

Appendix A, MEPA Certificate and Responses and *Appendix B, Comment Letters and Responses* of this *2007 EDR* include responses to all the comments on the *2006 EDR* that relate to air quality and noise.

M-001-002 Certificate and the comments received as requiring response in the next EDR. The EDR should provide a "snapshot" of the 2007 operations and impacts, with more substantial analysis awaiting the next ESPR. Massport should file the 2007 EDR no later than October 15, 2008 (although I

M-001-003 encourage Massport to file sooner, given the relatively few requirements for the next EDR).

M-001-004 A distribution list for the 2007 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.

Responses to Comments

The comments received on the 2006 EDR are thoughtful and detailed although I note that some of the comments were received only one day before this Certificate was to be issued. I request that during the review of the 2007 EDR that commenters make every attempt to submit

M-001-005 comments by the close of the comment period to allow time for review. The 2007 EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments included in this EDR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the 2006 EDR focused on air quality and noise related issues, including measurement of noise, modeling of noise contours, and noise abatement. In

M-001-006 addition to responding to these comments, the 2007 EDR and future EDRs should also continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commentors where necessary.

Organization of the Certificate

I have organized the remainder of this Certificate to respond to issues raised roughly in the order in which they were presented in the 2006 EDR, although I have for the most part incorporated discussion of issues raised in the technical appendix into the discussion of the environmental impact analyses.

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This chapter presents aviation activity statistics for Logan Airport in 2006 and compares activity levels to the prior year including air passengers, aircraft operations, fleet mix, and cargo/mail volumes. Air passenger traffic at Logan Airport reached 27.7 million, up from 27.1 million in 2005. The total number of aircraft

M-001-002

The filing and review schedule of this *2007 EDR* complies with this request. In some cases, where it makes sense to provide such context, limited historical trend discussion is provided, otherwise the *2007 EDR* provides a snapshot of 2007 conditions and compares 2007 conditions to those of 2006.

M-001-003

In accordance with MEPA's request, this *2007 EDR* was filed with MEPA on September 15, 2008.

M-001-004

Massport distributes paper copies of the Logan Airport EDRs and Environmental Status and Planning Report (ESPRs) to representatives of federal, state, and city government agencies, commentors on the previous year's report, and to community groups and individuals concerned with Airport activities. The full list is included in *Appendix D, Distribution* of the *2007 EDR.*

Appendix A provides copies of all ESPR and EDR certificates issued since the *2004 ESPR* as well as responses to reviewer comments. Technical Appendices E through J contain all background data, tables, and figures used to support the chapters of the *2007 EDR*.

M-001-005

Appendix A, MEPA Certificate and Responses, and *Appendix B, Comment Letters and Responses* of this *2007 EDR* contain Massport's responses to the substantive comments raised on the *2006 EDR*. The responses provided are specific in terms of addressing the questions raised and the comments made by each commentator. In some cases, the relevant chapter of the *2007 EDR* has been expanded to address issues raised in comments.

operations decreased in 2006 even though the total number of air passengers increased because airlines increased the number of passengers per aircraft operation. Specifically, the total number of aircraft operations declined from 409,066 in 2005 to 406,119 in 2006 which is a decrease of 0.7 percent. Air cargo volumes continued to decline from 728 million pounds in 2005 to 679 million pounds in 2006 with the largest volume decrease in the express/small packages. I advise Massport to consider and attempt to address all comments related to activity levels in the next 2007 EDR.

M-001-007

Planning

The Airport Planning chapter provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2006. It also describes known future planning, construction, and permitting activities. Specifically, several projects were completed in 2006. The new Terminal A, which opened on March 16, 2005, achieved Leadership in Energy and Environmental Design (LEED) certification in June 2006. It is the first airport terminal in the U.S. to earn this ranking. In addition, in November, 2006 the MBTA Silver Line service was enhanced with the addition of the Massachusetts Bay Transportation Authority's (MBTA) Charlie Card automatic fare collection kiosks in all Logan Airport terminals. Several construction projects were also completed, including the construction of the North Service Road (SR-2) Roadway Buffer, which consists of a sidewalk linking the Blue Line Airport Station to Logan Airport Terminals, and a landscaped area adjacent to the sidewalk. Construction of Phase 1 of the Southwest Service Area (SWSA) buffer, which began in 2005, was completed in the fall of 2006, and the Navy Fuel Pier Edge Buffer was completed in December 2006.

Regional Transportation

This chapter describes activity levels at New England's regional airports in 2006 and updates recent planning activities. Massport has demonstrated that it is coordinating its planning with other transportation agencies, and that this planning effort is aimed at minimizing cumulative impacts from Logan Airport operations. The 2006 EDR includes estimates of potential passenger diversions from Logan, and outlines how Massport planning encourages those diversions.

In general, the 2006 EDR has met the requirements laid out in the ESPR Certificate. The directives in the ESPR Certificate were laid out to have Massport look at potential diversions, and explain how its planning and coordination with other agencies could impact potential diversions. The 2006 EDR has performed this task.

Overall, the number of air passengers utilizing New England's primary commercial service airports in 2006 declined marginally, from 48.0 million to 47.9 million. When measured by the number of aircraft operations, however, activity levels fell by 4.4 percent, from 1.4 million operations to 1.3 million operations. This reflects substantial changes in the commercial aviation sector and the continued decline of general aviation (GA) noted in the 2005 EDR. Major airlines

M-001-006

The *2007 EDR* continues to report on the improvements in noise measurement and flight tracking systems. All of the measured data from the monitors for 2007 were collected from the upgraded noise measurement equipment, which is part of the new Noise Monitoring System (NOMS). Massport continues to evaluate the flight tracking system.

M-001-007

Appendix A, MEPA Certificate and Responses and *Appendix B, Comment Letters and Responses* of this *2007 EDR* address all the comments on the *2006 EDR* that relate to activity levels. *Chapter 2, Activity Levels* of this *2007 EDR* reports on air passengers, aircraft operations, fleet mix, and cargo/mail volumes at Logan Airport in 2007.

reduced capacity at the regional airports in 2006 as they reconfigured their operations in an effort to consolidate gains made in bankruptcy and near-bankruptcy restructuring. Passenger declines were generally consistent with capacity reductions. In addition, the average aircraft size of scheduled flights to the regional airports declined in 2006 as airlines substituted regional jet service for mainline jets on certain routes. Declines in GA activity in New England (declined by 4.2 percent from 2005 levels) continue to outpace declines in the rest of the country. According to the FAA as reported in the 2006 EDR, GA activity declined by 1.3 percent nationally in 2006, largely due to rising fuel costs.

Ground Transportation

The 2006 EDR serves its purpose of updating 2006 ground access conditions on the airport, and has also adequately addressed the larger ground access issues identified in previous Certificates, as discussed below.

This chapter reports on transit ridership, roadways, traffic volumes, and parking for 2006. Specifically, ground transportation activity levels increased across the board from 2005 to 2006 as a result of a 2.4 percent increase in the number of air passengers. Also, a portion of I-90 connecting the City of Boston and areas to the south and west of Boston to Logan Airport was closed from July 2006 until early 2007, which is believed to have reduced traffic flows to and from the Airport. The 2006 EDR reports that ridership on the MBTA, Logan Express, water transportation, scheduled and unscheduled HOV Services, and taxis increased in 2006. This is due in part to the completion of roadway and other construction projects at the Airport, and to the closure of the I-90 connector to the Airport for much of 2006. Massport-subsidized service provided by the C & J Bus Company began in 2006 providing early morning transportation between New Hampshire and Logan Airport. The 2006 EDR also reports that the number of on-Airport parkers decreased by 8.4 percent in 2006.

Noise

The Noise Abatement chapter updates the status of the noise environment at Logan Airport in 2006, and describes Massport's efforts to reduce noise levels. The technical appendix contains useful and detailed information, while the main text provides a solid analysis of major noise issues. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring a point raised by several commenters. The EDR represents an appropriate forum to serve this updating function.

In 2006, the overall number of people exposed to Day-Night Sound Level (DNL) values greater than 65 decibels (dB) decreased in 2006 compared to 2005. An estimated 5,583 people were exposed to DNL levels greater than 65 dB in 2006, compared to 6,477 in 2005, and 9,438 in 2004. For the second year in a row, fewer than 7,000 people experienced levels of 65 dB DNL and above. The 2006 Cumulative Noise Index (CNI) of 152.6 Effective Perceived Noise Level (EPNdB) remained well below the cap of 156.5 EPNdB. The CNI decreased compared to 2005

primarily because of decreased use of recertificated aircraft by cargo operators.

Massport provided sound insulation for 857 residential dwelling units in 2006. This is the largest number of units to receive sound insulation in the vicinity of the Airport in any one year since the beginning of the program. Since the program's inception, Massport has sound insulated a total of 9,943 dwelling units. The majority of the units insulated in 2006 were in Chelsea.

M-001-008 The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2007 EDR. I also strongly advise Massport to consider and address the comments received that have raised noise related concerns.

Air Quality

The Air Quality/Emissions Reduction chapter provides an overview of airport-related air quality issues in 2006 and efforts to reduce emissions.

The emissions inventory results are driven largely by improvements to the FAA Emissions and Dispersion Modeling System (EDMS), v5.0.1. These include the addition of aircraft main engine startup VOC emissions; adjustments to how aircraft performance profiles are modeled, which changed aircraft times-in-mode and thus emissions of all pollutants; an advanced method to calculate aircraft PM10/PM2.5 emissions; and updated ground support equipment (GSE) emission factors using NONROAD2005. The in-place air quality initiatives at Logan Airport and other ongoing efforts by Massport to minimize emissions also played a role, as did changes to aircraft taxi time, fleet mix, and number of operations.

The 2006 EDR reports that emissions inventory changes show an increase in VOC over 2005 levels attributed to the changes to EDMS. The 2006 EDR reported that total VOC emission number is up 34 percent (1,724 kg/day). The total NO_x emissions were one percent lower than reported in the 2005 EDR. In 2006, NOx emissions at Logan Airport were approximately 677 tons per year (tpy) lower than the 1999 threshold level established by Massport's Air Quality Initiative. This represents a 28 percent decrease since1999. There was a continuing trend of decreasing NO2 concentrations at both the Massport and Massachusetts Department of Environmental Protection (MDEP) monitoring sites located in the general vicinity of Logan Airport. In addition, in 2006 the annual NO2 concentrations at all monitoring locations were well below the NO2 air quality standards.

For the second year (2005 EDR was the first year), estimates of particulate matter emissions associated with Logan Airport are reported in this 2006 EDR in response to the recent availability of an FAA-approved method for computing particulate matter emission factors for aircraft. The total CO decreased 15 percent and the total PM_{10} /$PM_{2.5}$ decreased seven percent below the 2005 EDR reported numbers.

The 2006 EDR emissions inventory analysis used the actual aircraft fleet mix, except in the few

M-001-008

Chapter 6, Noise Abatement of the *2007 EDR* describes noise conditions at Logan Airport in 2007 as well as Massport's progress on implementing noise abatement measures. *Appendix A, MEPA Certificate and Responses* and *Appendix B, Comment Letters and Responses* of this *2007 EDR* address comments on the *2006 EDR* that relate to noise.

instances where aircraft/engine types or combinations were not available in the EDMS database. Data included aircraft type, engine, landing and takeoff operations (LTOs) and aircraft taxi times. Aircraft types are divided into four categories: commercial air carriers, commuter aircraft, general aviation and cargo.

M-001-009 The 2007 EDR should continue updates on the information presented in the 2006 EDR and address comments received related to air quality. In particular the City of Boston has raised

M-001-010 several concerns the Massachusetts Department of Public Health's (DPH) Logan Airport Health Study and the air quality monitoring study. The 2007 EDR should update the status of discussions with the City of Boston related to this concern.

M-001-011 Last, I ask that Massport consult with the MEPA office regarding the recently promulgated Greenhouse Gas Emissions Policy and Protocol prior to subsequent filings.

Water Quality/Environmental Compliance

This chapter describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management. Specifically, Logan Airport experienced 92 hazardous material spills in 2006, 11 (12 percent) were considered reportable (i.e., over 10 gallons) under the applicable environmental regulations. Jet fuel spills accounted for 65 (71 percent) of the total spills, with nine of the jet fuel spills exceeding 10 gallons. The remaining 27 spills (29 percent) involved gasoline, hydraulic oil, diesel fuel, and other substances, including two reportable spills.

In 2006, only four of 332 outfall samples exceeded the regulatory limits. The West Outfall and the Maverick Street Outfall each had one sample which exceeded the 15 milligrams per liter (mg/L) National Pollutant Discharge Elimination System (NPDES) limit for oil and grease. The North Outfall had two samples which exceeded the 0.3 milliliters per liter (ml/L) daily maximum limit for settable solids. This is an improvement compared to 2005, when eight samples exceeded the regulatory limits. In accordance with the Massachusetts Contingency Plan (MCP), Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination. In 2006, two of its five MCP sites were closed out, and Massport was working

M-001-012 towards achieving regulatory closure of the three remaining MCP sites. In accordance with the Massachusetts Contingency Plan (MCP), Massport should continue to report in the 2007 EDR how Massport will assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Sustainability at Logan Airport

This chapter describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable

M-001-009

Chapter 7, Air Quality/Emissions Reduction of this *2007 EDR* contains updated air quality information for 2007. *Appendix A, MEPA Certificate and Responses,* and *Appendix B, Comment Letters and Responses* of this *2007 EDR* contain Massport's responses to the substantive comments related to air quality raised on the *2006 EDR*. The responses provided are specific in terms of addressing the questions raised and the comments made by each commentor. In some cases, the relevant chapter of the *2007 EDR* has been expanded to address issues raised in comments.

M-001-010

Chapter 7, Air Quality/Emissions Reduction of the *2007 EDR* provides an update on the Massachusetts Department of Public Health Study and the Massport Air Quality Monitoring Study. Massport has provided data to the Massachusetts Department of Public Health (MDPH) in support of their study. Massport worked cooperatively with the Massachusetts Department of Environmental Protection (MA DEP) and MDPH in the development of the Massport Air Quality Monitoring Study and provides regular reports to these agencies on the results of the air monitoring.

M-001-011

Chapter 7, Air Quality/Emissions Reduction of the *2007 EDR* contains a greenhouse gas (GHG) emissions inventory for Logan Airport. As agreed to by MEPA, the GHG emissions inventory was prepared following Executive Office of Energy and Environmental Affairs (EEA) guidelines. An inventory of GHG emissions will be conducted annually and the results will be reported in the EDR/ESPR.

M-001-012

Contaminated sites subject to the Massachusetts Contingency Plan

EEA #3247 EDR Certificate 11/01/07

design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision.

This chapter describes Massport's continued efforts including Massport-wide sustainability and details how sustainability is incorporated into many aspects of Massport's activities: Planning and Design; Construction; Operations, Maintenance and Management; and Monitoring of Environmental Performance.

Massport has been a leader in sustainable development. Terminal A, which opened in 2005, received LEED certification in 2006. It is the first airport terminal in the country to receive such certification, and is a model for other airports in the country. In addition, in an effort to reduce air pollutants, Massport is phasing in alternative fuel vehicles in place of conventionally-fuel vehicles. At the airport, Massport maintains electric vehicles infrastructure, as well as a privately operated CNG station to power newer vehicles. The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2007 EDR.

M-001-013

November 1, 2007
Date

Ian A. Bowles

Comments Received:

10/24/07	Nancy Timmerman
10/25/07	Stephen Kaiser
10/26/07	Town of Lincoln, Lincoln Board of Selectmen
10/31/07	City of Boston's Environment Department
10/31/07	The Boston Harbor Association

IAB/ACC/acc

8

(MCP) that still require further action are identified in *Chapter 8, Water Quality/Environmental Compliance and Management* of the *2007 EDR*. In 2007, there were five sites where further action was being undertaken including the Fuel Distribution System (3-1287), the North Outfall (3-4837), the Former Robie Park (3-10027), the Former Robie Property (3-23493), and Tomahawk Drive (3-27068). Massport submitted a Class A-2 Response Action Outcome (ROA) for the Citgo Service Station (3-2616) in 2007 and no further action is required for this site.

M-001-013

Chapter 1, Introduction/Executive Summary of this *2007 EDR* includes an update on sustainability initiatives undertaken by Massport in 2007.

Copies of Secretary of the Executive Office of Energy and Environmental Affairs Certificates issued for the Reporting Years 2004 and 2005

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114-2524

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MITT ROMNEY
GOVERNOR
KERRY HEALEY
LIEUTENANT GOVERNOR
STEPHEN R. PRITCHARD
SECRETARY

August 16, 2006

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS ON THE ENVIRONMENTAL STATUS AND PLANNING REPORT

PROJECT NAME	: 2004 Logan Environmental Status and Planning Report
PROJECT MUNICIPALITY	: Boston / Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: June 7, 2006

As Secretary of Environmental Affairs, I hereby determine that the Environmental Status and Planning Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00).

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become (consistent with the objectives of the MEPA regulations) part of Massachusetts Port Authority's (Massport) long range planning. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific EIRs. The ESPR is currently updated on a five-year basis, with much less detailed Environmental Data Reports filed in the years between submission of the ESPRs. The 2004 ESPR is the subject of this Certificate.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs (EOEA) issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions

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where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the *1997 Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

This 2004 ESPR was originally scheduled to be completed in 2005, but was postponed until 2006. The 2004 ESPR was delayed because of delays associated with the completion of the New England Regional Aviation System Plan (NERASP). Massport adopted the NERASP forecasts for its 2020 Logan Airport forecast of aviation activity in this ESPR, and upon which the analysis of 2020 environmental conditions is based. Postponing completion of the 2004 ESPR ensured that the forecasts used in the ESPR are the most current and accurate forecasts available.

Review of the 2004 ESPR

In general, the ESPR has responded to the scope. In particular, the ESPR contains a wealth of useful data on activity levels and impacts, and lays out a forecast for trends in the future years. The technical studies in the 2004 ESPR included reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking.

As always, EOEA remains committed to evaluating and addressing the cumulative impacts of airport operations on the nearby communities. In June 2001, Massport agreed to work with EOEA on structuring a proposed Air Quality Initiative (AQI). The Certificate indicated that Massport was "to solicit project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." This Certificate on the ESPR reiterates that Massport has committed to the Air Quality Initiative, a key program designed to mitigate the cumulative air quality impacts of airport operations. The 2005 EDR should detail how Massport is meeting this commitment. The 2005 EDR must also address all of the air quality issues raised by the commenters.

Although Massport has presented a detailed ESPR, I remain concerned with a number of environmental issues, specifically air quality and noise related issues, as outlined below.

Follow-up

Massport should submit the next EDR (analyzing conditions for the 2005 calendar year no later than December 15, 2006. I recognize that this Certificate requires the inclusion of considerable follow-up in that document. However, ESPRs invariably raise important issues which require follow-up sooner rather than later, and this ESPR is no exception. I anticipate that the EDR in a year following the publication of an ESPR will always have to include such analytical follow-up to the ESPR and respond to comments on the ESPR. Other EDRs should provide more of a

"snapshot" of the previous year's operations and impacts, with more substantial analysis awaiting the next GEIR. EDRs in years other than the year immediately following publication of an ESPR should therefore be considerably less voluminous and Massport should strive to submit these documents by July 31 of the year following the subject year.

Responses to Comments

The next EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments included in this ESPR is well-constructed and cross-referenced (although several comments have complained of general responses or document references in response to specific questions). Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the EDR focused on air quality and noise related issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2005 EDR and future EDRs should also continue to report on the refinements to noise tracking and abatement efforts.

Airport Activity Levels

The ESPR included a chapter on airport activity levels, including information on aircraft operations, fleet mix, passenger activity levels, and cargo and mail operations. This chapter also reported on Massport's forecasts that will become the basis for Massport's strategic planning initiatives over the next few years. Past forecasts were based on low, medium, and high passenger activity levels. New forecasts are now based on the forecasts for 2020 developed for the New England Regional Airport System Plan (NERASP) study. This chapter included aircraft operations and passenger activity forecasts, and provided a discussion of methodologies and assumptions, including anticipated fleet mix changes and other trends in the aviation industry.

Air passenger traffic at Logan Airport continued to rebound in 2004, but remained below the peak year level reached in 2000. The total number of passengers using Logan Airport in 2004 increased by 14.7 percent over 2003 levels to 26.1 million passengers. Although the recovery in passenger demand was underway in 2004 at Logan Airport and throughout the industry, legacy commercial airlines continued to struggle financially as competition from low cost carrier (LCC) rivals increased and fuel prices remained high.

For the first time since 1998, total annual aircraft operations (arrivals and departures) at Logan Airport increased compared to the previous year and were at their highest level since 2001. Daily operations in 2004 averaged approximately 1,107 compared to approximately 1,027 in 2003, an increase of about 80 operations per day or about 8.6 percent. 2004 levels remain below historic peaks. The growth in aircraft activity was driven primarily by the entry and expansion of LCCs at Logan Airport in 2004. This increase in LCC services in 2004 stimulated growth in airport

passenger demand.

In 2004, Logan Airport ranked 19th among US airports in total cargo volume. All-cargo operations at Logan Airport declined by less than 1 percent in 2004. However, total cargo volume, including cargo carried in the belly compartments of passenger aircraft, rose by 0.6 percent.

Airport Planning

This section described the status of planning initiatives and projects through the planning horizon year (2020) for the Terminal Area; Airside Area; Service and Cargo Areas; and Edge Buffers and Landscaping. The Airport Planning Chapter also reported on the status of public works projects implemented by other agencies within the boundaries of Logan Airport.

Several projects were completed in 2004:

- The majority of construction of the main terminal and satellite concourse of Delta Air Lines' Replacement Terminal A Project was completed in 2004.
- A dedicated hourly parking area opened on the lower level of the Terminal B Garage in July 2004.
- Massport also launched Exit Express, Massport's convenient way to pay for parking.
- The Massachusetts Bay Transportation Authority's (MBTA's) $23 million new Blue Line Airport Station opened in June 2004.
- Demolition of the old MBTA Airport Station was completed in 2004.
- By the end of 2004, completion of the Central Artery/Tunnel (CA/T) Project and improvements to the roadway system were complete, allowing for a more efficient roadway network with shorter and more direct routes between destinations in the airport and the regional highway system.
- The Silver Line, the most recent addition to the transit system and Boston's first Bus Rapid Transit line, began limited service to Logan Airport in December 2004.

Both Massport and Logan Airport's tenants are proposing projects or exploring planning options to modernize and carry out future improvements at Logan Airport. Massport's planning criteria for Logan Modernization are based on accommodating 45 million annual passengers in airport terminals, facilities, and on airport roadways. Future projects and planning concepts include:

- Both Massport and Logan Airport's tenants are proposing projects or exploring planning options to modernize and carry out future improvements to the existing terminal facilities. Some projects and planning concepts include ongoing expansion and upgrade of Terminal E and constructing a new satellite Federal Inspectional Services (FIS) Facility at the southeast end of Terminal B.
- Some projects and planning concepts that are underway or under consideration include, consolidating flight kitchen facilities in the north service area, constructing new multi tenant maintenance facilities for ground service equipment (GSE), and constructing new

hangar facilities in the north cargo area.

- Airside improvements include upgrades and improvements to the airfield to enhance the operations efficiency and safety of Logan Airport. Some projects and planning concepts that are underway or under consideration include, installing a security wall along the perimeter of the air operations area, providing additional aircraft parking for certain types of aircraft, and an airside improvements planning project to reduce current and projected levels of aircraft delay.
- Buffer areas are being designed in consultation with Logan Airport's neighbors and other interested parties in an open community planning process. Some future airport buffer projects and planning concepts include, landscaping the former Navy Fuel Pier at Jefferies Point, installing a landscaped border in conjunction with the north service area Economy Parking Lot construction, and constructing a half-acre linear area with landscaping and lighting improvements along Maverick Street.
- Massport is considering a parking strategy to address future on-airport parking demands. Some ongoing and future parking projects and planning concepts include redeveloping three parcels into a combined economy parking facility with the capacity for up to 1,750 vehicles, proposed parking facility in the Southwest Service Area, and a new consolidated facility for all car rental operations

Regional Transportation Context

Overall, aviation activity levels at New England's regional airports increased in 2004, as passenger demand continued to rebound both within the region and nationally after the 2001 downturn. Just as the passenger decline seen at the regional airports in the wake of September 11, 2001 was less severe than the declines experienced at Logan Airport, the traffic recovery seen at the regional airports in 2004 was not as strong as the rebound experienced at Logan Airport. Growth at Logan Airport was largely fueled by a growing presence of LCC services. At the same time, regional airports continued to experience growth in 2004 and served a significant (42.5 percent) share of the region's air passenger traffic. Several factors have contributed to the success of the regional airports in recent years:

- Many of the regional airports benefited from the introduction and growth of LCC services over the past several years. This trend began when Southwest Airlines entered the New England market in 1996 by serving T.F. Green Airport in Warwick, Rhode Island and later expanding into the Manchester and Hartford/Bradley International Airports. The trend continued in 2004 when Spirit Airlines began service from T.F. Green Airport, Independence Air5 initiated low-fare service at several of the regional airports, and Southwest Airlines continued to increase service from its New England airports.
- Several of the smaller airports, particularly Burlington, Bangor, and Tweed-New Haven continued to benefit from the introduction of regional jets and gained new non-stop services to airline connecting hubs, which increase service options for regional airport passengers.

Ground Transportation

The chapter reported on 2004 conditions and provided a comparison of 2004 findings to previous years for variety of ground transportation indicators. The chapter also presented a discussion of analysis methodologies and assumptions for future year conditions for the planning horizon year 2020 for Traffic volumes, On-airport Vehicle miles traveled (VMT) and Parking demand.

- Completion of the CA/T and Logan Airport Modernization projects created a more efficient roadway network with shorter and more direct routes to destinations within Logan Airport.
- With the exception of water transportation, all scheduled and unscheduled high occupancy vehicle (HOV) transportation to Logan Airport saw increased ridership in 2004.
- Overall HOV mode share for air passengers increased from 25.8 percent in 1990 to 32 percent in 2003. Although the data shows a slight decrease to 30.3 percent in HOV modes in 2004, the 2003 HOV mode share was an all-time high, reflecting Massport's success in generally maintaining or increasing the percentage of passengers using HOV modes in all market segments.
- The most recent employee survey showed an employee HOV mode share of 26.8 percent.
- Airport-related average annual daily traffic (ADDT) volumes increased by 12.6 percent in 2004 over 2003 volumes. Despite this increase in ADDT volumes, the vehicle miles traveled (VMT) on Logan Airport's roadway system only increased by 3.5 percent in 2004 compared with the 2003 VMT. This reflects the effects of the changes in the airport roadway system resulting from the CA/T and Logan Airport Modernization projects, which result in a shorter average trip length, creating a much smaller increase in total VMT than in average weekday daily traffic volumes.
- Massport executed a Memorandum of Understanding with the MBTA to commence Silver Line bus rapid transit service in late 2004. Massport's support of the Silver Line Airport service will total more than $30 million over ten years.

Between 2003 and 2004, membership in the Transportation Management Association (TMA) declined by 800 employees, a 13.3% reduction. Massport stated in the ESPR that significant TMA funds had been expended for administrative functions resulting in underfunded programming. The Executive Office of Transportation's MassRIDES program will now provide a TMA coordinator at state expense. The EOT identified its expectation that Massport will "maintain its current level of effort, including both cash contributions and in-kind services.

The Secretary's June 15, 2001 Certificate on the AIPP directs Massport to require that all Logan employers join the TMA at the earliest possible opportunity. This mitigation measure is not listed in Table 10-7 and no plan is presented for meeting this requirement. A plan should be detailed in the 2005 EDR.

The ESPR indicated that two FAA programs had relocated to New Hampshire in 2004 and that Beacon-Skanska, having completed the construction of Terminal A, was no longer at Logan. Four additional corporate members left the TMA in 2004. The 2005 EDR should provide explanation for this.

The 2003 EDR stated that TMA shuttle ridership declined by 32.4 percent due to the elimination of services at mid-year due to lack of funding., but that the decrease in shuttle ridership had been more than off-set by increased Logan Express use. Massport should identify any efforts such as more active marketing of car/ridesharing options targeted to those who previously used the cancelled shuttles. This information should be provided in the 2005 EDR.

Noise

This chapter began with an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, the methodologies used to track noise, and what if any changes there was in noise modeling. The information in this chapter built upon the findings of the Boston Logan Overflight Noise Study. This chapter also updates the status Massport's efforts to reduce noise levels and provides noise contours population counts for 2020.

- Massport has continued to make improvements in the noise modeling process as the sophistication of noise models and data acquisition systems has advanced. Recent developments in noise modeling technologies and techniques employed in this 2004 ESPR and to be used in future years include: use of a new radar data acquisition system, known as a long-range PASSUR, for the source of all radar-based operations data; a new upgrade to Massport's radar data processing software; use of the latest update to the FAA's Integrated Noise Model, while retaining the unique capability to account for over-water sound propagation and hill effects unique to Logan Airport; incorporation of more than 1,800 modeled flight tracks, checked and updated where necessary to reflect 2004 radar data; use of radar data to determine the "best-fit" match among each of the nearly 402,000 radar traces captured by Logan Airport's noise monitoring system and the available climb profile contained within the INM database; procurement of an improved noise and operations monitoring system; procurement of automated altitude profile and noise contour generation software.
- From May to August 2004, Runway 4L-22R was closed either completely or partially to accommodate repaving. Due to this closure, jet aircraft departures on Runway 22R decreased by approximately 23 percent compared to 20036 while departures on other runways increased.
- As a result of changes in airport operations in 2004, the number of people exposed to Day-Night Sound Level (DNL) values greater than 65 dB increased compared to the number in 2003. An estimated 10,720 people were exposed to DNL levels greater than 65 dB in 2004, compared to 7,183 in 2003, and 8,309 in 2002. The majority of the increase occurred in East Boston off the northwest end of Runway 33L. The increases within the

65dB are in areas that were previously sound insulated. Despite these increases, the total count of people exposed to 65 dB DNL and above was 23 percent lower than in 2001.

- The 2004 Cumulative Noise Index (CNI) of 153.4 Effective Perceived Noise Level (EPNdB) remained well below the cap of 156.5 EPNdB. Although CNI also increased compared to 2003 and 2002 as a result of the increased number of operations, the 2004 level remained below the 2001 CNI value.

- The number of residential dwelling units for which Massport provided sound insulation in 2004 was 791. Since the program's inception, the total number of dwelling units receiving sound insulation is now 8,615. In addition, Massport completed sound insulation of a 36th school – the new Center School located in Winthrop.

The Logan Airport Noise Study is now expected to be conducted in at least three phases. I strongly encourage Massport to include a phase for the monitoring and assessment of altered flight paths so that any necessary modifications can be identified and implemented.

In addition, the ESPR indicated that there will be an increase from 2004 to 2020 in the number of Boston residents who will experience noise in the 70-75 DNL and the 75-80 DNL due to the use of parallel runways. Massport strive to identify ways to ensure that these increases do not occur. The 2005 EDR should include a preliminary discussion about how Massport will address projected exceedances.

Air Quality

This chapter presented an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. It also predicts emission levels for 2020.

- To ensure consistency and comparability between 1999 and 2004 air quality emissions, the 1999 air emissions inventory was updated with information that was not available when first reported and 1999 emissions were recalculated using the new version of the FAA's Emissions and Dispersion Modeling System (EDMS) v4.21. Additional data were also added to the 2004 inventory in order to increase the accuracy of the results, for example curbside queue times were updated and new parking areas were added to the inventory.

- In 2004, the emission inventory results were driven by an 8 percent increase in aircraft operations compared to 2003 activity levels. Increases in stationary source (fuel storage facilities, heating plant, etc.) emissions further contributed to the increase in levels of volatile organic compounds (VOCs) and oxides of nitrogen (NOx).
- In 2004, total VOC emissions at Logan Airport were estimated to be approximately 1,360

kilograms (kg)/day, which is an increase of 17 percent from 2003 levels. However, total VOC emissions at Logan Airport were 41 percent lower in 2004 than in 1999. The increase of VOC emissions between 2003 and 2004 was due to the increase in aircraft operations in 2004.

- In 2004, total NOx emissions from all airport-related sources were estimated to be 4,290 kg/day, which is an increase of 16 percent from 2003 levels, but is a 26 percent decrease as compared to 1999 levels. Once again, the increase in aircraft operations contributed the most to this increase in airport-related NOx in 2004.

- Total carbon monoxide (CO) emissions at Logan Airport in 2004 were estimated to be 9,852 kg/day, or 3 percent below 2003 levels. In 2004, total CO emissions at Logan Airport were 32 percent lower than 1999 levels. While CO emissions from aircraft increased due to increased aircraft operations, the use of alternative fuel vehicles (AFVs) and the lower emission rates of the motor vehicle fleet helped to reduce the overall CO emissions in 2004. Massport added three new AFVs to its fleet in 2004.

- Massport developed an Air Quality Initiative (AQI) in 2001 as a long-range program with the overall goal to maintain NOx emissions associated with Logan Airport at or below the 1999 level of 2,347 tpy. In 2004, NOx emissions from all airport-related sources were estimated to be 1,726 tpy, well below the 1999 level.

Through the June 15, 2001 Certificate of the Secretary of EOEA on the FEIR for the AIPP, Massport was directed to develop a program to maximize the use of single-engine taxiing procedures by all of its tenant airlines. Massport must describe in the 2005 EDR how it presently encourages reduced-engine (single-engine) taxiing. The cited issues of safety and practicality should be discussed and the program that will be implemented as noted in Table 10-7of the 2005 ESPR should be outlined.

Massport was also directed in the same Certificate to conduct follow-up air quality monitoring in neighborhoods surrounding the airport and surrounding flight paths. This mitigation measure does not appear in Table 10-7, "Logan Airside Improvements Planning Project, Details of Ongoing Section 61 Mitigation Measures." The 2005 EDR should address this measure in detail.

Table 7-13 of the 2004 ESPR , "Inventory of Tracking of NOx Emissions in tons per year for Logan Airport," contains numbers that have been "adjusted to reflect know reductions achieved by Massport and its tenants at Logan Airport." The 2005 EDR should include unadjusted numbers and detailed information about the means for achieving reductions and the emissions value of each reduction method.

Massport had agreed to work with EOEA on structuring a proposed Air Quality Initiative (AQI) in the June 2001 Certificate for the AIPP. The Certificate indicated that Massport was "to solicit

project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." There is no information in the ESPR about the substance and status of any process with EOEA or about the solicitation of information and objective, neutral, scientific review. The 2005 EDR should address this matter in detail.

Environmental Management/Water Quality/Environmental Compliance

This chapter reported on the activities of Massport's Environmental Management Unit in meeting the state's environmental regulatory requirements.

- In 2004, of the 126 spills reported to the Logan Airport Fire-Rescue Department, 18 spills (14 percent) were ten gallons or greater in quantity. Jet fuel spills accounted for 82 (65 percent) of the total spills, with 12 spills (15 percent) being ten gallons or greater in quantity. The remaining 44 spills involved gasoline, hydraulic oil, diesel fuel, ethylene glycol, propylene glycol, paint, and AVGAS. Of these spills, 6 (14 percent) were ten gallons or greater. Since 2002 there has been a reduction in the total volume of all spills.

- In accordance with the Massachusetts Contingency Plan (MCP), Massport continues to assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Massport indicates that it has had limited success in identifying the causes of exceedances due to "first flush" pollutants in stormwater, the number of potential sources at Logan, and the size of drainage areas serving outfalls. Massport needs to develop a plan for maximizing its ability to identify causes. This plan should be identified in the 2005 EDR. Massport should also include in the 2005 EDR copies of any new NPDES stormwater and fire training permits.

Sustainability Initiatives

This Chapter presented Massport's on-going and upcoming sustainability initiatives at Logan Airport. Massport continues to demonstrate forward thinking in sustainability policies and practices for transportation agencies. I encourage Massport to require tenant participation and compliance with all elements of the plan as leases are renewed.

As I stated at the beginning of this Certificate, the 2005 EDR must provide responses to the issues raised in comments received. The 2005 EDR must include a copy of this Certificate and a copy of each comment letter received on the 2004 ESPR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, and noise abatement. Massport should consult directly with individual commentors where necessary.

A distribution list for the 2005 EDR (indicating those receiving documents, CDs, or Notices of

Availability) should be provided in the document. This section must also include copies of all GEIR/Annual Update Certificates issued since 1995 to provide context for reviewers. Supporting technical appendices should be provided as necessary.

August 16, 2006
Date

Robert W. Golledge, Jr.

Comments received:

07/25/06	Stephen Kaiser
08/08/06	Nancy Timmerman
08/09/06	MA Executive Office of Health and Human Services
08/09/06	John Vitagliano
08/09/06	Bruce Egan, Egan Environmental
08/10/06	City of Boston Environment Department
08/14/06	Boston Transportation Department

RWG/ACC/acc

The Commonwealth of Massachusetts
Executive Office of Environmental Affairs
100 Cambridge Street, Suite 900
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Deval L. Patrick
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Timothy P. Murray
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Ian A. Bowles
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February 15, 2007

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
2005 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME	: 2005 Environmental Data Report
PROJECT MUNICIPALITY	: Boston / Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: December 23, 2006

As Secretary of Environmental Affairs, I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00).

The environmental review process at Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become (consistent with the objectives of the MEPA regulations) part of Massachusetts Port Authority's (Massport) long range planning. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific EIRs. The ESPR is currently updated on a five-year basis, with much less detailed Environmental Data Reports (EDR) filed in the years between submission of the ESPRs. The 2005 EDR is the subject of this Certificate.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs (EOEA) issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the *1997 Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

Review of the 2005 EDR

In general, the EDR has fulfilled its purpose of providing a "snapshot" of year 2005 passenger and impact levels at Logan Airport. Most environmental parameters showed significant improvement in calendar year 2005. In particular, the technical studies in the 2005 EDR included reporting on and analysis of key indicators of airport activity levels, airport planning, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking.

As always, EOEA remains committed to evaluating and addressing the cumulative impacts of airport operations on the nearby communities. In June 2001, Massport agreed to work with EOEA on structuring a proposed Air Quality Initiative (AQI). The Certificate indicated that Massport was "to solicit project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." The 2005 EDR reiterates that Massport has committed to the Air Quality Initiative, a key program designed to mitigate the cumulative air quality impacts of airport operations. The 2005 EDR details how Massport is meeting this commitment. The 2006 EDR should continue to report on the details of Massport's committment. In addition to the environmental issues listed below, the 2006 EDR should address all of the air quality and noise related issues raised by the commenters during the review of the 2005 EDR.

Follow-up

Massport should file the next EDR (covering operations for the 2006 calendar year) in calendar year 2007. The EDR should provide more of a "snapshot" of the 2006 operations and impacts, with more substantial analysis awaiting the next GEIR. Massport should also address the comments received on the current EDR when developing its 2006 EDR.

Responses to Comments

The next EDR must include Responses to Comments which addresses all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments

included in this EDR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the next EDR, although the Responses to Comments should pay particular attention to increased specificity, where necessary.

The majority of comments received on the 2005 EDR focused on air quality and noise related issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2006 EDR and future EDRs should also continue to report on the refinements to noise tracking and abatement efforts.

Activity Levels

The Activity Levels chapter presents aviation activity statistics for Logan Airport in 2005 and compares activity levels to the prior year including air passengers, aircraft operations, fleet mix, and cargo/mail volumes. Air passenger traffic at Logan Airport continued to rebound in 2005, but remained below the peak year level reached in 2000. Specifically, the total number of passengers using Logan Airport in 2005 increased by 3.6 percent over the prior year to 27.1 million passengers. In 2005, total aircraft operations (409,066 operations) at Logan Airport increased by 0.9 percent over 2004 levels. While 2005 passenger traffic at Logan Airport was approximately equal to 1999 levels, in 2005 these passengers were being carried on approximately 86,000 fewer flights (495,000 flights in 1999 versus 409,066 flights in 2005). Several commenters raised concerns with the increase in passenger levels requesting long-term solutions to meeting demand which do not include expansion of Logan Airport's capacity or footprint. I advise Massport to consider and attempt to address these comments in the next 20006 EDR.

Planning

The Airport Planning chapter provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2005. It also describes known future planning, construction, and permitting activities. Specifically, several projects were completed in 2005 including the majority of construction of the main terminal and satellite concourse of Delta Air Lines' Replacement. Terminal A Project was completed in 2004, with final fit up and commissioning in 2005. Massport also launched Exit Express as part of an on-going program to improve parking facilities and improve air quality through enhanced circulation and reduced idling at the toll booths. In addition, as part of a cooperative venture between the Massachusetts Bay Transportation Authority (MBTA) and Massport, initial Silver Line service to the airport began in December 2004. Full Silver Line service to Logan Airport began on June 1, 2005.

The chapter also includes future planning including: ongoing expansion and upgrade of Terminal E and completion of West Garage Phase II(Central Garage Expansion); more efficient ways of using the limited land resources in the service areas; airside improvements include upgrades and improvements to the airfield to enhance the operations, efficiency and safety of Logan Airport; In addition, buffer areas are being designed in consultation with Logan Airport's neighbors and other interested parties in a community planning process. Massport is also considering a parking strategy to address future on-airport parking demands. Some ongoing and future parking projects and planning concepts include redeveloping three parcels into a combined economy parking

facility with the capacity for up to 1,750 vehicles and a new consolidated facility for all car rental operations.

Regional Transportation

This chapter describes activity levels at New England's regional airports in 2005 and updates recent planning activities. Overall, the number of air passengers utilizing New England's primary commercial service airports in 2005 rose by 5.3 percent over 2004. When measured by aircraft operations, however, activity levels fell by 0.6 percent. This reflects sweeping changes in both the commercial aviation and general aviation (GA) sectors of the industry. Passenger numbers rose despite capacity reductions as airlines operated at higher load factors. Carriers flew fewer flights to the regional airports than in 2004, but used larger aircraft on average in 2005, and carried more passengers. GA operations at New England airports declined by 3.8 percent from the 2004 levels. The Boston Transportation Department has raised a number of suggestions related to the Regional Transportation that Massport should consider in the 2006 EDR.

Ground Transportation

This chapter reports on transit ridership, roadways, traffic volumes, and parking for 2005. Specifically, ground transportation activity levels increased from 2004 to 2005 as a result of a 3.6 percent increase in the number of air passengers. In addition, traffic volumes on airport roadways increased by 5.8 percent, while the vehicle miles traveled (VMT) on the airport increased by 4.2 percent. The lower VMT growth when compared to overall traffic volume growth suggests that more direct connections over shorter roadway distances are provided. The facilities at the MBTA Blue Line Airport Station were also substantially improved in 2005, including the conversion from a manual to an automated fare collection system. In addition, full MBTA Silver Line service to Logan Airport began on June 1, 2005. In 2005, Terminal A and its associated access roadways were fully opened for operation. There were no other roadway modifications completed in 2005. In addition, contract negotiations began between Massport and the C & J Bus Company in New Hampshire to expand early morning transportation between New Hampshire and Logan Airport. This service began in 2006. Massport also re-bid its Logan Airport Transportation Management Association (Logan TMA) contract with the Executive Office of Transportation (EOT) through the MassRIDES program.

Noise

The Noise Abatement chapter updates the status of the noise environment at Logan Airport in 2005, and describes Massport's efforts to reduce noise levels. In 2005, the number of people exposed to Day-Night Sound Level (DNL) values greater than 65 decibels (dB) decreased compared to 2004. An estimated 6,477 people were exposed to DNL levels greater than 65 dB in 2005, compared to 9,438 in 2004, and 7,183 in 2003. The total count of people exposed to 65 dB Day-Night Sound Level (DNL) and above was 55 percent lower than in 2001. Winthrop, which has always experienced the highest levels of noise exposure of any community around Logan Airport, continued its decline in the number of people exposed to levels greater than 65 DNL. This number has dropped 81 percent since reaching its peak in 1998. The number of residents

exposed to noise over 75 DNL increased from 2004 but still remained below 2001 levels.

The 2005 Cumulative Noise Index (CNI) of 153.2 Effective Perceived Noise Level (EPNdB) remained well below the cap of 156.5 EPNdB. The CNI decreased slightly compared to 2004 even with a slight increase in the number of operations in 2005. This decrease is primarily due to decreased use of recertified aircraft by cargo operators. Massport provided sound insulation for 471 residential dwelling units in 2005. Since the program's inception, Massport has sound insulated a total of 9,086 dwelling units. The majority of the units insulated in 2005 were in Winthrop.

The information in this chapter is very informative and I encourage Massport to continue with its updates in the 2006 EDR. I also strongly advise Massport to consider and address the numerous comments received that have raised noise related concerns in comments.

Air Quality

The Air Quality/Emissions Reduction chapter provides an overview of airport-related air quality issues in 2005 and efforts to reduce emissions. The 2005 emissions inventory results are driven by the small increase in aircraft operations at Logan Airport compared to 2004 levels. Compared to 2004 levels, total emissions of volatile organic compounds (VOCs) are estimated to have decreased by approximately 6 percent to 1,285 kilograms per day (kg/day). In 2005, total emissions of oxides of nitrogen (NOx) were estimated to be 4,187 kg/day, which is a 2 percent decrease from 2004 levels. Total emissions of carbon monoxide (CO) in 2005 were 9,556 kg/day, or 3 percent lower than 2004 levels.

For the first time, estimates of particulate matter emissions associated with Logan Airport are reported in this 2005 EDR in response to the recent availability of an FAA-approved method for computing particulate matter emission factors for aircraft. Total emissions of particulate matter (PM2.5) at Logan Airport in 2005 were approximately 83 kg/day [33 tons/year (tpy)]. NOx emissions at Logan Airport in 2005 were approximately 662 tpy lower than 1999 levels—a 28 percent decrease. It appears that there is an ongoing trend of decreasing nitrogen dioxide (NO2) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MassDEP) monitoring sites located in the general vicinity of Logan Airport. In addition, annual NO2 concentrations at all monitoring locations were well below the NO2 air quality standards in 2005. The 2006 EDR should continue updates on the information presented in the 2005 EDR.

Water Quality/Environmental Compliance

This chapter describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan, and tank management. Specifically, of the 97 spills reported in 2005, 15 (15 percent) were ten gallons or greater in quantity. Jet fuel spills accounted for 66 (68 percent) of the total spills, 12 of the jet fuel spills (18 percent) were ten gallons or greater in quantity. The remaining 31 spills involved gasoline, hydraulic oil, diesel fuel, and other substances. Of these spills, only

three (10 percent) were ten gallons or greater. In 2005, only eight samples exceeded the regulatory limits. The North Outfall had two samples which exceeded the 15 milligrams per liter (mg/L) National Pollutant Discharge Elimination System (NPDES) limit for oil and grease, and the Porter Street Outfall had one sample exceed this limit. The North Outfall had two samples which exceeded the 0.3 milliliters per liter (ml/L) daily maximum limit for settable solids, and the West Outfall had three samples exceed this limit. No other exceedances occurred. In accordance with the Massachusetts Contingency Plan (MCP), Massport should continue to report in the 2006 EDR how Massport will assess, remediate, and bring to regulatory closure areas of subsurface contamination.

Sustainability at Logan Airport

This chapter describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision. This chapter describes Massport's continued efforts.

As I stated at the beginning of this Certificate, the 2006 EDR must provide responses to the issues raised in comments received. The 2006 EDR must include a copy of this Certificate and a copy of each comment letter received on the 2005 EDR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, and noise abatement. Massport should consult directly with individual commentors where necessary.

A distribution list for the 2006 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all GEIR/Annual Update Certificates issued since 1995 to provide context for reviewers. Supporting technical appendices should be provided as necessary.

February 15, 2007
Date

Ian A. Bowles

Comments Received:

01/30/07	**State R**epresentative Robert A. DeLeo
01/31/07	Joseph Felzani
02/05/07	Boston Transportation Department
02/06/07	Nancy Timmerman
02/07/07	Stephen Kaiser
02/13/07	**City of Boston Environment Depar**tment

IAB/ACC/acc

B

Comment Letters and Responses

- The five comment letters received by the Massachusetts Environmental Policy Act (MEPA) Office on the *2006 Environmental Data Report (2006 EDR)* are reprinted here in the order shown below. As requested in Secretary of the Executive Office of Energy and Environmental Affairs' Certificate, Massport has provided responses to substantive comments raised in these letters.
  - Sara Mattes, Town of Lincoln
  - Bryan Glascock, City of Boston Environment Department
  - Vivien Li, The Boston Harbor Association
  - Stephen H. Kaiser, PhD, member of the public
  - Nancy Timmerman, P.E., consultant in Acoustics and Noise Control

TOWN OF LINCOLN

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AC

BOARD OF SELECTMEN
Gary A. Taylor, Chair
Sarah Cannon Holden
Sara a. Mattes

22 October 2007

Secretary Ian A. Bowles
Executive Office of Energy and Environmental Affairs (EOEEA)
MEPA Office Director Deerin Babb-Brott
Attn.: MEPA Analyst: Anne Canaday
100 Cambridge Street, Suite 900
Boston, MA 02114

RECFIVEL
OCT 26 2007
MEPA

Project Name : 2006 Logan Environmental Data Report (EDR)
EOEA Number : #3247
Project Proponent : Massachusetts Port Authority, Boston, MA
Comment Deadline: October 25, 2007

Dear Secretary Bowles:

The 2006 Environmental Data Report (EDR) for the Boston Logan International Airport filed by Massport is in response to the Scope approved by the Secretary.

We are encouraged by the new leadership at the EOEEA and hope that the projections for Hanscom in the Logan EDR will receive this year an even more careful and critical scrutiny than in the past. Much of what Massport says in the EDR that it is planning for the development of Hanscom should be rejected before the 2006 Logan EDR is granted approval. In the past, we were often disappointed with the MEPA review process and therefore sometime stopped submitting comments. This year, however, we believe our comments may receive more attention. Thus, we are submitting comments for consideration of the MEPA Office and look forward to having our points reviewed and adopted.

L-001-001 We feel compelled to comment, because we find Massport's outline of their vision for the future of the L.G. Hanscom Airport ("Hanscom") very disturbing; Massport's plans to continue developing facilities at Hanscom in order to promote the growth of activity and operations at Hanscom is out of keeping with Massport's prior commitments and contrary to the interests of the Commonwealth.

We look forward to a careful review of our comments and clear directions from the Secretary to Massport to edit and correct their latest Logan EDR.

Sincerely,
Sara Mattes
Sara Mattes, Chair
Hanscom Area Towns (HATS)
Lincoln Board of Selectmen

Cc:
Bedford Board of Selectmen; Concord Board of Selectmen; Lexington Board of Selectmen;
Senator Susan Fargo; Representative Tom Conroy; Representative Charles Murphy; Representative Jay Kaufman;
Representative Cory Atkins

1

L-001-001

Massport continues to operate Hanscom Field as the region's premiere facility for business/corporate general aviation (GA) and as a GA reliever to Logan Airport. Massport's ongoing maintenance and safety enhancements support Hancom Field's role as a reliever to Logan Airport. Redevelopment of existing hangar facilities as well as new hangar facilities is in keeping with Hancom Field's role as a GA reliever to Logan Airport and directly supports the Massachusetts econony.

LATE COMMENT

RECEIVED

OCT 31 2007

MEPA

October 30, 2007

Ian A. Bowles, Secretary
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, 9th Floor
Boston, MA 02114
Attention: Anne Canaday, MEPA Office

Re: 2006 Logan International Airport Environmental Data Report
EEA #3247

Dear Secretary Bowles:

The City of Boston Environment Department has reviewed the Massachusetts Port Authority's (Massport) Logan International Airport (Logan) Environmental Data Report (EDR) for the year 2006 and offers the following comments.

The City of Boston continues to believe that the Centerfield Taxiway will increase aircraft queuing with associated noise and pollutant emissions. With decisions about arrivals, departures and taxiway use under the jurisdiction of Boston Tower personnel, neither the FAA or Massport can make an enforceable commitment that the proposed taxiway will reduce the currently intolerable levels of taxiway idling. Until the City and its residents can be assured that public health and safety and quality of life will not be adversely affected by the taxiway, it should not be constructed.

We thank Massport for the Response to Comment format which made correlating comment and answer more easily accessible than have prior arrangements.

AIR QUALITY AND NOISE

As we have said before, a focus on air quality associated with Logan is appropriate as demonstrated by Massport's institution of the AQI, the Massachusetts Department of Public Health's (DPH) Logan Airport Health Study and the air quality monitoring study. It is important that then-EOEA Secretary Bob Durand stated in his June 2001 Certificate for the AIPP that Massport had agreed to work with

L-002-001

EOEA on structuring a proposed Air Quality Initiative (AQI). **The Certificate indicated that Massport was "to solicit project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." Based upon these conditions, Secretary Durand found that "issues of air quality impacts have been adequately addressed for purposes of MEPA review."** To our knowledge, no neutral organization has been asked to engage in a science-based review. Massport has not responded to this comment.

Again, as we have said before, the City of Boston sees the potential for collaboration; cumulative assessments of air quality and joint work to reach sound conclusions in the Logan Air Quality Study based upon mutually acceptable science. We suggested that Massport and its air quality study

L-002-001

The referenced commitment was contingent on a potential exeedance of 1999 NOx levels. To date, Logan emissions have remained below that level. The Massport Air Quality Monitoring Study was implemented on schedule in September 2007. Massport worked cooperatively with the Massachusetts Department of Environmental Protection (MA DEP) and Massachusetts Department of Public Health (MDPH) on development of the study and the initial air monitoring results have been presented to both MA DEP and MDPH. An independent audit of the monitoring equipment and methods was also conducted in accordance with the Quality Assurance Project Plans (QAPP).

L-002-001

consultant work with staff of the MA DPH, the MA DEP and the City of Boston Environment Department and Boston Public Health Commission to ensure a protocol that is acceptable to all parties. The Director of this department was invited to one meeting with other parties and we are unsure about the level of participation by each of the other two agencies. **This department believes that credibility with Logan's neighbors can only be achieved if a study is based upon assumptions and a methodology that are accepted by the City and by state agencies that have expertise in the subject areas and, in the case of the DPH, are already involved in a closely related effort.** Former Secretary Durand was astute in his requirement that an objective, science-based process by a neutral organization be employed to review the project. The health and air quality studies are unprecedented and it is essential that the combined expertise of environmental and health professionals be harnessed to make the most of this exceptional opportunity. We ask that you strongly urge Massport, before it proceeds further with study development, to hold additional, regular meetings with stakeholders including this department to help ensure the success of this effort.

Emissions inventory changes show an increase over 2005 levels. The 2006 total VOC emission number is up about 34 percent (1,724 kg/day). Total NO_x emissions were one percent lower; total CO down 15 percent; total $PM_{2.5}$ /PM_{10} down seven percent.

Massport attributes the changes to the Federal Aviation Administration's (FAA) a modified Emissions and Dispersion Modeling System (EDMS) v5.0.1. The addition of main engine start-up, adjustments to the modeling of aircraft performance models (changes time-in-mode), advanced $PM_{2.5}$ /PM_{10} calculations and upgrades GSE emission factors.

Massport's 2006 emissions inventory analysis used the actual aircraft fleet mix, except in the few instances where aircraft/engine types or combinations were not available in the EDMS database. Data included aircraft type, engine, landing and takeoff operations (LTOs) and aircraft taxi times. Aircraft types are divided into four categories: commercial air carriers, commuter aircraft, general aviation and cargo.

In 2006, total LTOs decreased by one percent from 2005. Air carrier LTOs increased by four percent, cargo was unchanged, commuter LTOs decreased by nine percent and general aviation decreased by four percent. Aircraft taxi times increased by less than one percent.

In the 2005 EDR, Massport noted that an air quality monitoring study is required as a condition of the Massachusetts Environmental Policy Act (MEPA) for the AIPP and, separately, in connection with the proposed Centerfield Taxiway. Massport reports that it has developed a plan, set aside funding and selected a contractor to conduct air quality monitoring in the Logan vicinity with monitoring to begin in 2007.

Clearly a focus on air quality associated with Logan is appropriate as demonstrated by Massport's institution of the AQI, the Massachusetts Department of Public Health's (DPH) Logan Airport Health Study and the air quality monitoring study. We note that then-EOEA Secretary Bob Durand stated in his June 2001 Certificate for the AIPP that Massport had agreed to work with EOEA on structuring a proposed Air Quality Initiative (AQI). The Certificate indicated that Massport was "to solicit project submissions from local governments and community groups, which will be reviewed in an objective, science-based process by a neutral organization such as NESCAUM." Based upon these conditions, Secretary Durand found that "issues of air quality impacts have been adequately addressed for purposes of MEPA review."

L-002-002

Massport estimates that 894 fewer people were exposed to DNL values greater than 65 dB in 2006 than in 2005 with fewer than 7,000 people exposed to 65 dB or above. (The number fewer than 7,000

L-002-002

An estimated 5,583 people (1,417 less than 7,000) were exposed to Day-Night Sound Levels (DNL) greater than 65 dB in 2006, 894 fewer people than in 2005.

L-002-002 should be specified.) Massport has concluded that the change is due to changes in airport operations and runway use.

Calls to Massport's Noise Complaint Line during 2006 represented an increase of 33.4 percent over 2005 levels.

The City of Boston is an active participant in the Boston Logan Airport Noise Study and looks forward to results that will reduce the noise burden in the City.

ACTIVITY LEVELS AND REGIONAL CONTEXT AND PLANNING

The total number of passengers using Logan in 2006 was 27.7 million, an increase of 2.4 percent increase over 2005 and only 1,400 fewer passengers than in 2000.

L-002-003 Total aircraft operations decreased by 0.7 percent over 2005 levels to 406,119. Regional and non-jet operations have decreased. Nighttime flights by commercial operators increased by one percent. Why was there an increase?

Total General Aviation (GA) operations decreased by 3.70 percent; jet operations increasing by 2.95 percent and non-jet decreasing by 28.75 percent. Nighttime GA flights decreased by 43 percent.

Total all-cargo volume decreased from 728 million pounds in 2005 to 679 million pounds in 2006 [(13.53 percent)]. All-cargo operations decreased by only 0.85 percent. Passenger airlines carried 270 million pounds of cargo.

Nine percent of all night flights are flown by cargo operators using recertified Stage 3 aircraft – 60 percent of total nighttime cargo flights throughout the year.

L-002-004 The EDR states that although the PRAS has not been operational since 2004, runway configurations have been similar to those that would be flown under PRAS. However, in 2006, Runways 4R/L was used 20.7 percent more in excess of PRAS goals for arrivals and no less than 18.2 percent in excess for departures (departure percentage for 2006 is listed as "Z3.8 percent). The actual number should be provided in the 2007 EDR. Runway 9 arrivals in 2006 were 20 percent higher than PRAS goals. Runways 22L/R arrivals were 9 percent higher and departures were 13.7 percent in excess of PRAS goals.

New England Regional Airports and their increases/decreases in passenger activity for 2006 were:

- Bradley International, CT (3.60) percent
- T. F. Green, RI (3.74) percent
- Manchester, NH (4.50) percent
- Portland International Jet Port, ME (6.31) percent
- Burlington, VT (0.07) percent
- Bangor, ME (0.90) percent
- Tweed-New Haven, CT (25.70) percent
- Pease International Tradeport, NH 5.48 percent
- Hanscom Field, MA 31.41 percent
- Worcester Regional, MA "insignificant"

Regional airport 2006 cumulative commercial aircraft operations decreased by 4176 percent over 2005 levels, GA operations declined by 4.15 percent and military/other decreased by 4.12 percent. Logan's commercial flights decreased by 0.46 percent, GA by 4.51 percent and military/other by 4.12 percent.

L-002-003

The increase in commercial airline operations during the nighttime period of 10:00 PM to 7:00 AM is the result of airline scheduling decisions and reflects new nonstop routes or increased services to existing markets.

L-002-004

The 2006 effective jet aircraft runway use for Runway
End 4R/L departures was 3.8 percent in 2006. This correction is provided in Table 6-5 of *Chapter 6, Noise Abatement* of the *2007 EDR*.

BED comments - 2006 Logan International Airport EDR, EEA #3247, Page 4

L-002-005 As did the 2005 EDR, the 2006 EDR indicates that Massport is assisting a bus company in providing early morning service to Logan with a late evening return. The EDR states that the target passengers are persons on the North Shore and southern New Hampshire including flight crews and TSA employees.

The 2007 EDR should document the characteristics of use of this service.

L-002-006 We continue to be disturbed that there has been no local outreach on the released NERASP study. It would seem timely, given the level of public attention and involvement related to Logan and the issues included in Phase II, that the outreach so integral to the plan be commenced in Logan's service area. Massport identifies its participation in the study as significant participation in regional planning and stated in the 2005 EDR that results of the outreach program, subsequent experience, and periodic data collection will be used to produce future revisions to the forecasts and strategies." It is frustrating that Massport has not discussed in any ESPR/EDR documents how the study will inform its planning and activities. The role of other airports and transportation modes in meeting mid- and long-term regional transportation needs is important to Logan-affected communities. Massport should outline in the 2007 EDR its outreach plan with or without FAA participation.

We look forward to information on the work of the Regional Transportation Coordinating Council (RTCC) that was established to study and increase the use of regional airports.

GROUND TRANSPORTATION, TRANSPORTATION DEMAND MANAGEMENT AND PARKING

L-002-007 Massport indicated in the 2004 ESPR that it continued to express to the Massachusetts Turnpike Authority (MTA) interest in Silver Line access to the "slip-ramp" and that the MTA responded that the ramp cannot accommodate buses and that a safety problem would be created for traffic in the HOV lane. Massport offered to prepare a Scope and fund a study but MTA declined. The slip ramp was used during a closure of the Ted Williams Tunnel which resulted in reduced pressure on the Callahan and Sumner Tunnels. Massport was to continue discussions with the MTA. We ask that this issue be updated in the 2007 EDR.

Traffic volume and VMT data is not provided for 2006 due to the lack of full I-90 access during much of the year.

Overall parking exits decreased by 8.4 percent between 2005 and 2006 with the greatest decrease in the zero to four-hour category. The commercial parking supply increased by 564 spaces during that time.

We commend Massport for the installation of Charlie Card machines in Logan's terminals.

The use of Logan Express is up by 5.4 percent at Woburn, 7.9 at Braintree and 9.1 at Framingham. Use of the Peabody service is down by 14.7. Massport believes that use is split evenly amongst employees and air passengers.

Three organizations left the Logan TMA in 2006 and three new organizations joined. The organizations that left the TMA did so because the program did result in a tangible increase in employee HOV use so paying dues was not worthwhile. Nine organizations representing a total of 1,009 employees are members; a 65 percent reduction from 2005.

L-002-008 Please include in the 2007 EDR the total number of employees at Logan Airport, obtained through a tenant survey if necessary. We ask that the number not be reported in FTEs and include a breakdown of full-time, part-time and contract employees.

L-002-005

Working with C&J Trailways, Massport has been providing marketing support for an extra early morning trip and an evening trip from Portsmouth, NH to Logan Airport. The earliest morning service leaves from Portsmouth at 3:00 AM and arrives at Logan Airport at 4:15 AM and the last evening service leaves at 11:15 PM and arrives at Logan Airport at 12:50 AM. A roundtrip adult fare from Portsmouth costs $43.00, or $32.00 for a same day roundtrip. Further information is provided on the C&J Trailways website at www.ridecj.com.

The additional service supports air passengers as well as airport employees. The service provides high occupancy vehicles (HOV) access for passengers with early departures and/or delayed arrivals. Employees who staff security check points and concessions find the extra service particularly valuable for arriving on time for early morning shifts.

L-002-006

The *New England Regional Aviation System Plan* (NERASP) Study will be used by Massport and the Federal Aviation Administration (FAA) in planning for the mid- and long-term facility needs at Logan Airport. The *Logan Airport 2009 Environmental Status and Planning Report* (*2009 ESPR*) will report on these future facility needs. Please refer to the NERASP website (www.faa.gov/airports_airtraffic/airports/regional_guidance/new_england/planning_capacity/airport_system_plan) for more information on the status and findings of the NERASP Study.

L-002-007

A contract for a study of the potential for Silver Line access to the "slip ramp" is pending as of this writing. Massport intends to complete this study in coordination with Massachusetts Bay Transit Authority (MBTA) and Massachusetts Turnpike Authority in 2008.

L-002-009 TMA staff met in late 2006 meetings with major employers but no information is provided regarding the substance of the meetings and identified next steps. What were the results?

L-002-010 It may be useful to interview employees about their commuting habits. TMA members would have an opportunity to identify what motivated them to join and the membership benefits most useful. Information from employees who are not members would help in developing services that meet their needs. A survey should also identify the number of employees who are not native English speakers and may find that materials in their native tongue more accessible.

L-002-011 Eligibility criteria for TDM services can be a crucial element in a TMA's success. We surmise that many employees at Logan work part-time and/or split shifts. It is important to know if part-time and contract workers are not eligible for TMA services through their employers.

We note that transit subsidies are not included as elements of the TDM plan. Massport and tenants who provide parking are subsidizing spaces if employees pay any amount less than the commercial rates for on-airport parking and market rates for off-airport parking.

L-002-012 Please provide in the 2007 EDR detailed information about the locations, numbers of spaces and charges for employee parking off-airport.

L-002-013 The 2005 EDR indicated that Massport has met with several tenants to better understand their needs and plans to conduct assessments with all tenants in the future. Please provide results in the 2007 EDR.

PROJECT MITIGATION TRACKING

L-002-014 Please report in the 2007 EDR the findings that Delta has made regarding electric and other alternative fuel baggage tugs and the alternative fuels that are available for infrastructure and GSE operations. The 2007 EDR should also provide an update on the status and time-line of Delta's plan for conversion of GSE to alternative fuels and for converting to baggage tugs to electric operation.

L-002-015 Please include in the 2007 EDR the replies from airlines in response to Massport's correspondence encouraging the use of single-engine taxiing.

L-002-016 The following language in Table 9-6, *Logan Airside Improvements Planning Project (EOEA #10458) Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2006)*, regarding Runway 14-32 Operations and Construction Mitigation – "…Massport will enter into contract with appropriate government body and/or community group(s) to enforce intended unidirectional runway, if requested." It is identified as completed mitigation. We request clarification on this measure.

Massport's participation in the planning of regional transportation policy and the implementation of measures designed to maximize broad regional transportation options are important elements of the mitigation for the AIPP. Four of the 11 Regional Transportation Policy Mitigation Policies/Programs in Table 10-7 of the 2004 ESPR, *Logan Airside Improvements Planning Project, Details of Ongoing Section 61 Mitigation Measures (as of December 31, 2004)*, involve the two-phase New England Regional Aviation System Plan (NERASP), a multi-party air service study for which Massport is the contract administrator.

WATER QUALITY

L-002-017 We ask that the 2007 EDR contain the NPDES permit approved by the EPA on July 31, 2007.

L-002-008

The *Economic Impact Report 2006* prepared by Massport reported that Logan Airport employed a total of approximately 12,000 people (a full time equivalency of 10,879 jobs) in 2004. This is the most up-to-date information available on the number of employees at Logan Airport.

L-002-009

The meetings with employers in 2006 led to the creation of three transportation demand management (TDM) programs: Commuter Cash, Sunrise Shuttle, and Preferential Parking for car/vanpoolers. All of these programs were implemented in 2007 and further information is provided in *Chapter 5, Ground Transportation* of the *2007 EDR*. The Logan Employee Transportation Management Association (Logan TMA) also concluded that there should be a restructuring of the membership dues to reflect the TDM efforts put forth by the employers themselves. This restructuring of membership dues is currently under review.

L-002-010

Massport is working with the Executive Office of Transportation and Public Works (EOTPW) (who provide the Logan TMA coordinator position through their MassRIDES program) to restructure the Logan TMA membership. As part of the restructuring effort, the Logan TMA will be having conversations with each employer in order to develop future TDM services that best meet their needs. Massport will pass along to the Logan TMA coordinator the suggestion of determining whether or not Logan TMA information needs to be provided in languages other than English.

L-002-011

Massport is currently working with the EOTPW to restructure the Logan TMA membership to include all employers.

BED comments - 2006 Logan International Airport EDR, EEA #3247, Page 6

Massport indicates in Table 8-5, *Progress Report for Environmental Management*, that tenants are encouraged to incorporate BMPs into their daily operations and that it inspected ramp operations to ensure compliance.

L-002-018 The 2007 EDR should provide details about the recommended BMPs, the manner in which tenants are encouraged to implement the, the locations and number of inspections and inspection results.

Thank you for the opportunity to comment. We look forward to the continued implementation of important mitigation measures and to the information that the 2007 EDR will provide.

Sincerely,

Bryan Glascock
Director

cc: James W. Hunt, III, Chief of Environmental and Energy Services, City of Boston
Michael Kineavy, Director of Policy and Planning, City of Boston
Vineet Gupta, Director of Policy and Planning, Boston Transportation Department
Robert D'Amico, Boston Transportation Department
Jacquelyn Wilkins, Massachusetts Port Authority
Stewart Dalzell, Massachusetts Port Authority

L-002-012

Massport can only provide employee parking rates for parking lots or garages which it owns. For a list of employee parking areas, see *Appendix G, Ground Transportation*. Private, off-airport arrangements made by Massport staff are beyond the purview of Massport.

L-002-013

The Logan TMA coordinator will be having conversations with each employer to develop future TDM services that best meet their needs.

L-002-014

Chapter 9, Project Mitigation Tracking of the *2007 EDR* provides a status report on the progress Delta Air Lines has made regarding the use of alternative fuel vehicles as well as other mitigation commitments.

L-002-015

In August 2006, in an effort to reduce emissions of air pollutants associated with aircraft taxiing, Massport sent letters to all airlines operating at Logan Airport encouraging the voluntary use of single-engine taxiing, consistent with safety, pilot judgment, and federal law.

L-002-016

Runway 14-32 opened in late November, 2006. Since then, and in compliance with the 2002 Record of Decision (ROD) on the *Airside Improvements Planning Project EIS*, there have been no arrivals to Runway 14 and no departures from Runway 32. In 2007, the runway was used primarily for arrivals of regional jets and turboprops over Boston Harbor. As a consequence of these existing requirements, a contract would do nothing to further ensure undirectional use of Runway 14-32.

L-002-017

Chapter 8, Water Quality/Environmental Compliance and Management

of the *2007 EDR* contains a detailed description of the new National Pollutant Discharge Elimination System (NPDES) permit requirements. The new NPDES permit has not been included in the *2007 EDR* but is available in its entirety on the EPA's website at www.epa.gov/NE/npdes/logan/pdfs/finalma0000787permit.pdf.

L-002-018

Massport has developed a comprehensive Airport Operations Stormwater Pollution Prevention Plan (SWPPP) for Logan Airport in accordance with the new NPDES permit that was issued in July 2007. The Logan SWPPP was distributed to Massport Facilities, 27 co-permittees (airlines and fixed base operators), and car rental agencies in December 2007. The SWPPP contains over 50 Best Management Practices (BMPs) which Facilities, co-permittees and car rental agencies are required to implement to be in compliance with the NPDES permit. In addition, the Logan SWPPP contains a training module including a training CD that all parties must participate in to ensure compliance with the NPDES permit. Massport and co-permittees conduct monthly ramp inspections and are required to document and file the inspection reports in their SWPPP binder. Areas that are inspected include all the locations where fueling, deicing, maintenance and storage are conducted. Areas inspected include Terminal ramps, North Cargo, South Cargo, Facilities ramps, and car rental facilities. Massport expects any noted deficiencies to be corrected immediately.

LATE COMMENT

AC

The Boston Harbor Association
for a clean, alive and accessible Boston Harbor

30 October 2007

RECEIVED
OCT 31
MEPA

Secretary Ian Bowles
Executive Office of Energy and
Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114
ATT: MEPA Office

RE: EOEA #3247- Boston-Logan International Airport 2006 Environmental Data Report

Dear Secretary Bowles:

The Boston Harbor Association, a non-profit, public interest organization founded in 1973 by the League of Women Voters and the Boston Shipping Association to promote a clean, alive, and accessible Boston Harbor, has reviewed the Boston-Logan International Airport 2006 Environmental Data Report submitted by the Massachusetts Port Authority in September, 2007. The report is submitted as part of an ongoing state-level environmental review process that assesses Logan Airport's cumulative environmental impacts.

We commend Massport for its continuing efforts to be a "good neighbor" and responsible waterfront property owner. In particular, we want to call attention to three areas where Massport has made significant strides and deserves commendation: open space management; public transportation; and sustainable development.

374 Congress Street, Suite 307 ■ Boston, Massachusetts ■ 02210-1807 ■ Telephone (617) 482-1722 ■ Fax (617) 482-9750 ■ www.tbha.org

Open Space: As part of the Massachusetts Port Authority's efforts to enhance open space and buffers for local residents impacted by the operations of Logan Airport, two open space parcels opened in the past year. Remediation work began on the former Navy Fuel Pier in 2001 by the Army Corps of Engineers, and Massport made significant landscaping and public art improvements to the site. The Navy Fuel Pier Buffer opened to the public earlier this year, and is an attractive, well-designed landscaped segment used by many local residents along Boston Harbor. Massport also opened the roadway immediately adjacent to the buffer area, which had been closed to the community for many years.

Also this year, Bremen Street Park, an 18-acre park constructed by the Central Artery/Tunnel Project with significant input from the East Boston community and organizations such as Boston Natural Areas Network (BNAN), opened to the general public. Legislation in 2004 designated Massport as the agency responsible for the operation and maintenance of the park upon completion. The park is the second largest neighborhood park in East Boston, and is one of the most attractive parks in Boston, with playgrounds, wading pool, spray pools, bike and jogging paths, amphitheater, bocce courts, and public restrooms. It can be accessed directly from the MBTA's Airport station, as well as from Bremen Street and the East Boston Greenway walking and bike trail.

C-001-001 The two new open space areas should be maintained by Massport in a manner consistent with the maintenance standards at other Massport parks, specifically Piers Park in East Boston and South Boston Maritime Park across from the Fish Pier in South Boston.

Public Transportation: We commend the Massachusetts Port Authority, both as an employer and as the operator of Logan Airport, for active promotion and investments in public transportation. The 2006 Environmental Data Report indicates that ridership on mass transit to the airport increased in 2006, due to a combination of factors: completion of roadway and other construction projects at the Airport, closure of the I-90 connector to the Airport for much of the year, and installation of the MBTA automatic fare collection system at the airport terminal.

Massport has made significant capital investments in MBTA Silver Line service, the most recent addition to the City's transit system and Boston's first Bus Rapid Transit (BRT). Massport purchased eight of the dual mode 60-foot articulated Silver Line buses at a cost of $13.3 million, and expended $500,000 for the automatic fare card collection equipment at the MBTA Airport station.

C-001-002 Given the popularity of the Silver Line service, we strongly urge that more frequent headway in service be implemented, particularly during rush hours. Currently, it is not unusual for riders to have to wait for two or more vehicles before they can board

C-001-001

Massport maintains Bremen Street Park in a manner consistent with the maintenance standards adopted at other Massport parks. Massport maintains the Navy Fuel Pier Airport Edge Buffer in a manner consistent with the maintenance standards adopted at other Massport edge buffers.

C-001-002

In addition to passenger demand, transit vehicle headways are a function of line demand and available equipment. Service operates on 10 to 15 minute headways on weekdays between 5:50 AM and 1:00 AM and serves Terminals A through E at dedicated bus stops. If additional line capacity or equipment become available, service changes would be at the discretion of the Massachusetts Bay Transportation Authority (MBTA) and Massport.

at South Station. We look forward to implementation of Massport's total commitment to Silver Line service of $30 million over the next 10 years, particularly capital investments.

With regards to the MBTA Airport station, we commend the MBTA for the attractive renovation and ADA-compliant measures at the station. Furthermore, the Central Artery/Tunnel Project, MBTA, Massport, local residents, and BNAN are to be highly commended for successfully working together to ensure direct access from Airport station to Bremen Street Park. Continued maintenance and upkeep by Massport of both the station interior and open space exterior spaces will be key in the years ahead.

The number of water transportation operators and riders increased in 2006 compared to 2005. Four water transportation operators, up from two in 2005, now provide service to Logan Airport from a number of places in Boston Harbor. 2006 ridership was 115,000, slightly higher than 2004 water transportation ridership.

The water transportation terminal is ADA-compliant and very attractive, with public art on the inside and out. Courtesy CNG-powered buses provided by Massport run between the airport dock and all airport terminals. We commend Massport for this energy-efficient shuttle service, and urge continued maintenance of the user-friendly terminal for water transportation users.

C-001-003

C-001-003

The water transportation terminal will continue to be maintained and Massport will continue to provide shuttle service (using shuttles fueled by compressed natural gas) from the water dock to the terminals.

Sustainable Development: Massport has been a leader in sustainable development. Terminal A, which opened in 2005, received LEED certification in 2006. It is the first airport terminal in the country to receive such certification, and is a model for other airports in the country.

In an effort to reduce air pollutants, Massport is phasing in alternative fuel vehicles in place of conventionally-fuel vehicles. At the airport, Massport maintains electric vehicles infrastructure, as well as a privately operated CNG station to power newer vehicles. We urge that out-of-date conventional vehicles be replaced with alternative fuel vehicles, and that every effort be made to reduce the size of Massport's fleet, with continued promotion of mass transit options for both employees and visitors.

C-001-004

We understand that Massport is one of 15 state agencies which participates in the Commonwealth's Climate Protection Program to reduce greenhouse gas emissions, and urge that milestones be included in the 2007 Environmental Data Report for reduction of greenhouse gases.

C-001-005

Boston Harbor Beaches: In summer, 2006, Constitution Beach Bathhouse opened, making this beach, with its new playground, an attractive and important recreational resource for families and residents of East Boston. Noise and air pollution from Logan Airport, which is near Constitution Beach, can adversely impact the enjoyment of the beach by local residents. We strongly urge

C-001-006

C-001-004

As detailed in *Chapter 7, Air Quality/Emissions Reduction* of this *2007 EDR* Massport maintains a fleet of 58 alternative fuel vehicles, of which two were purchased in 2007. The fleet of alternative fuel vehicles includes 26 shuttle buses. *Chapter 5, Ground Transportation* of this *2007 EDR* describes Massport's efforts to promote the use of mass transit by employees and air passengers which includes promoting the use of the MBTA Blue Line and Silver Line, promoting the use of water transportation, operating shuttle buses, providing express bus service to Logan Airport from Braintree, Peabody, Framingham, and Woburn, and financially rewarding employees for using mass transit etc.

C-001-005

The *2007 EDR* contains the first greenhouse gas (GHG) inventory for Logan Airport. This initial assessment addresses both "direct" (within the Airport's geographic boundaries) and "indirect" (off the Airport site) GHG emissions, and was voluntarily prepared following the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) GHG guidelines. The 2007 GHG inventory for Logan Airport will be updated annually in the EDR/ESPR. As noted in *Chapter 7, Air Quality/Emissions Reduction,* guidelines are being developed by the Transportation Research Board for GHG inventories at airports. The Logan Airport GHG inventory may evolve to be consistent with such guidelines.

C-001-006

Massport works closely with tenant airlines on a range of initiatives to reduce noise and emissions of air pollutants. In August 2006, in an effort to reduce emissions of air pollutants associated with aircraft taxiing, Massport sent letters to all airlines operating at Logan Airport encouraging the voluntary use of single-engine taxiing, consistent with safety, pilot judgment, and federal law.

C-001-006 Massport to work aggressively with its tenant airlines to reduce air pollution emissions from aircraft taxiing as well as noise from aircrafts.

Water Quality: The 2006 Environmental Data Report indicates that Massport's primary water quality goal is to prevent or minimize pollutant discharges. It also implements best management practices for pollution prevention, and encourages its tenants to do likewise. These are important goals to ensuring a clean Boston Harbor.

C-001-007 Additional information should be provided regarding snow removal operations to ensure that snow, particularly on runways, is not being dumped into Boston Harbor. Also, additional information needs
C-001-008 to be provided regarding de-icing activities, including de-icing measures undertaken by airlines, to ensure that chemical materials are not entering Boston Harbor during de-icing of aircrafts.

Recently, additional shellfish beds opened off of Logan Airport near Winthrop. Because of the improved health of Boston Harbor, these beds were opened for the first time to licensed diggers. Efforts to ensure continued water quality improvements are key in maintaining these shellfish beds.

Earlier this year, Massport entered into an agreement with the Division of Marine Fisheries
C-001-009 regarding soft shell clam planting. As part of the Secretary's Decision on the 2006 Environmental Data Report, we ask that the Decision incorporate by

C-001-007

Snow removed from runways, taxiways and apron areas during snow removal operations is not deposited into Boston Harbor. Snowmelters are used near the terminals.

C-001-008

The new NPDES permit for Logan Airport which was issued on July 31, 2007, and went into effect on September 29, 2007, requires Massport to investigate the effect deicing operations may have on Boston Harbor, an effort which is underway in 2008. In addition, in 2008 Massport conducted sampling for deicing compounds in stormwater discharged from a number of Logan Airport's outfalls and will report the results in the *2008 EDR*.

C-001-009

The Agreement Regarding Shellfish Relocation Plan, including the financial commitment, was included in its entirety in *Appendix K, Logan RSA Shellfish Agreement* of the *2006 EDR*.

C-001-009 reference the Agreement, including the financial commitment and timetable to ensure additional safe clam beds.

Runway Safety Enhancements: Page 3-13 of the 2006 Environmental Data Report notes that Massport will be filing an environmental notification form for 22R and 33L Runway Safety Enhancements this year. Earlier this month, Massport filed a Notice of Intent with the Boston Conservation Commission to conduct core boring samples in anticipation of runway safety enhancements.

Everyone supports runway safety enhancements designed to ensure the safety of airline passengers, and we understand that Massport is considering a number of alternative enhancements. Runway safety enhancements should avoid the filling in of Boston Harbor, and we urge the Secretary's certificate to reaffirm the importance of avoiding the filling of Boston Harbor.

Thank you for your consideration.

Sincerely,

Vivien Li
Executive Director

AS

[redacted]

RECEIVED

OCT 25 2007

MEPA

To : Deerin Babb-Brott, MEPA Director
100 Cambridge Street Room 900
Boston, Mass. 02114
Attention : Anne Canaday

From : Stephen H. Kaiser, Association of Cambridge Neighborhoods

2006 Environmental Data Report, by Mass Port
EOEA # 3247

On Saturday, October 13, 2007 I attended an organized walk in Somerville, sponsored by the pedestrian-advocacy group WalkBoston. The walk generally followed Broadway up Winter Hill and was led by state Representative Denise Provost. The commentary highlighted some of the rich history of the 1960s through the 1980s.

However, about a dozen times during the hour-and-a-half walk on a Saturday morning, conversation was effectively stopped by the overhead passage of large commercial jets taking off from Logan Airport. When I inquired as to the cause for this disturbance, I was told that the increased noise was a consequence of the new runway 14-32 and the manner in which this new runway was being operated by MassPort.

Massport's Environmental Data document is useful in this regard, since on page 1-3 it gives us some of the history for the decades of controversy of runway extensions and citizen opposition. The report also tells us that the runway was opened for service on November 23, 2006. This late-fall opening probably included a period of gradual increases in use (for safety reasons) and it may have been a while before the current traffic of aircraft became fully established as it passed over highly populated sections of Somerville and Cambridge. The flight path typically involves North Cambridge as well, as numerous complaints have been lodged with City Councilors in Cambridge due to the increase in aircraft noise.

The timing of the new service patterns from runway 14-32 suggest an established program occurring primarily this year, in 2007, and not during the

calendar year 2006, the focus of Massport's current report before MEPA. Hence it would not appear that there has been an omission in the 2006 report and the issue of Runway 14-32 need not be a concern in our evaluation of the current report.

I-001-001 What has happened in Somerville and North Cambridge this years should mean that next year's report on 2007 data should place first priority on the policies of 14-32 runway use, the noise consequences and the population affected.

I-001-002 I would also hope by that time that Massport would have adopted new operational policies for this runway, and do so to the relief of the citizens of Somerville and Cambridge. Measurements of the effectiveness of noise reduction on the affected communities should also be included in the 2007 report.

SOUND MEASUREMENTS .... The text in the report provides little background on the method of measuring aircraft noise and developing standards of acceptability or violation. I presume that what is shown as "DNL" is the same as the old measurements of L_{dn} or noise level for day and night operations, with a penalty assigned for night operations. The use of the log scale for noise has been

I-001-003 a point of constant confusion for both lay and some technical readers. There should be a technical appendix which explains how noise levels are measured, how DNL is developed and how to assess relative noise levels.

I-001-004 I am also concerned about about the averaging or flattening out of peak noise, so that the contrast between instant peak and background noise is significantly reduced by the way that information is reported. I am not sure that DNL levels for overflights of Somerville would accurately represent the real annoyance factor created by these new plane operations.

To be specific, according to the methodology of DNL, what is the peak decibel level achieved by a Concorde jet breaking the sound barrier and as measured a half mile away and how is this single noise event expressed in DNL for a daytime or nighttime hour when there is no other noise activity other than background? I worry that our sound measurement and reporting methods may tend to poorly represent the actual noise objections which citizens complain about.

I-001-005 What are Massport's measurement of noise on the ground on a Saturday morning when so many of Rep. Provost's group had their tour disrupted? Do the measurements, in Massport's opinion, represent the extent of the annoyance created?

DATA SUMMARIES ..... I am happy to see the reintroduction and updating of former Figure 2-13, which had not been included in the 2005 report. This figure

I-001-006 shows a linear growth trend covering almost forty years of national data. I urge a similar diagram be prepared showing the passenger trends for Logan Airport. This comparison would show a larger effect of 9/11 events on Boston than nationally and a slower recovery of passenger trips.

I-001-001

The first full year of operation of Runway 14-32 was 2007. *Chapter 6, Noise Abatement* of the *2007 EDR* reports on the use of Runway 14-32 and other runways at Logan Airport in 2007, and discusses how changes in runway use affected the noise contours and the number of people exposed to noise levels above the 65 dB Day-Night Sound Level (DNL).

I-001-002

Chapter 6, Noise Abatement of the *2007 EDR* reports on the use of Runway 14-32. The Record of Decision (ROD) on the *Logan Airside Improvements Planning Project Final EIS* put forth specific conditions for the use of the new runway (ultimately it is the Federal Aviation Administration's (FAA's) air traffic control decision on how the runways at Logan Airport are used based on operational issues, weather conditions and safety). Runway 14-32 is unidirectional - there are no arrivals to Runway 14 and no departures from Runway 32. It operates primarily in northwest wind conditions. As predicted in the *Logan Airside Improvements Planning Project Final EIS* the 65 dB DNL noise contour for 2007 increased in East Boston when compared to the 2006 noise contour. This was an expected outcome of opening Runway 14-32.

I-001-003

Appendix H, Noise Abatement of the *2007 EDR* provides a description of the noise measurement methodology used.

I-001-004

DNL, the average day-night sound level in a year is the FAA's method of reporting airport noise. However, Massport also reports supplemental noise metrics such as Time Above (TA) which represents the time in minutes that aircraft noise is higher than predefined threshold sound

PARKING and TRENDS ..... The issue of parking on-airport and at off-airport shuttle sites would also benefit from a similar 40-year trend line. Parking garage occupancy figures would also provide us with a measure of utilization of available spaces, and it would not be unreasonable to provide a ten- to twenty-year extrapolation of passenger and parking trends.

I-001-007

In June, a proposal was made to combine a possible doubling of the size of the Boston Common Underground Garage, with the expectation that completion of the Silver Line would allow this downtown parking garage to serve as a satellite parking site for Logan service. What is the status of this proposal, and is it consistent with Massport's goals?

I-001-008

Does MassPort have projections of passenger and parking figures based on past trends? Could they include them in the 2007 report? If not, what report contains this information and could it be jointly made available to any reviewers of the 2007 report?

OVERVIEW ..... In reality, if one were to ask a wide cross-section of the citizenry what is the primary environmental impact of the airport, the answer in 95% of the cases would be noise. In this sense, airports are quite a bit like snowmobiles, which generate noise from engines that disrupt the domestic tranquility, yet also are connected to well-funded advocacy groups resistant to any tightening of noise regulations.

To a large degree, the public depends on the trust and good judgment of Massport to operate the airport in a proper respect to the general public interest, and no just special interests in the aviation sphere. MassPort must, at the risk of losing its freedom to act, show consistent respect for citizens who share the air and environment along the flight paths into Logan Airport. I had been impressed with the general performance of Massport in reducing noise from its war-zone levels of the early 1970s, and I especially noted the noise reduction in South Boston. Now my experience with Runway 14-32 has introduced doubt into my

I-001-009

mind, and I hope that MEPA can also express its concerns. Massport must make significant reductions in aircraft noise affecting citizens of Somerville and Cambridge, and any other community so impacted.

In my comments on the 2005, I mistakenly suggested that future air travel demand might be tempered somewhat due to a perceived trend towards distrust of top level managers. In combination with technological shifts in communication, I speculated that there could be a reduction in business trips in the future – or at least a slackening of the growth. However, the sins of Enron have faded into the mists of history, and dissatisfaction with events in Iraq has produced an apathetic public unable to ascertain any cause for blame or solution. The Yuppies will continue to see air flights as an important perk, and the growth in the global economy will likely stimulate even more passenger growth in future years.

levels. The threshold sound levels used are 65, 75, and 85 dBA so that the reader can evaluate the frequency of higher noise levels at noise monitoring sites due to overflights.

I-001-005

Massport measures noise at 30 noise monitoring sites around Logan Airport. 2007 was the first year that the new Noise Monitoring System (NOMS) was in place. The NOMS has improved measurement equipment, improved flight tracking and improved aircraft event detection so it is better able to determine whether noise measured at the noise monitoring sites is due to aircraft activity or other noise sources within the community. As shown in Table 6-8 of *Chapter 6, Noise Abatement* of the *2007 EDR*, measured noise levels attributable only to aircraft decreased at almost all the monitoring sites in 2007. The noise monitoring site at Medford (Site 22), which is the closest site to Somerville and Cambridge, experienced at 2 dB decrease in aircraft-only measured noise levels in 2007 compared to 2006.

I-001-006

Figure E-1 in *Appendix E, Activity Levels* of the *2007 EDR* shows air passenger and operations data for Logan Airport back to 1986. It shows the decrease in air passengers and operations that occurred after September 11, 2001.

I-001-007

Massport is supportive of the MBTA's efforts towards completion of the Silver Line as an enhancement to the City's overall transit system.

This is the third Logan Airport Environmental Data Report I have commented on, beginning with the 2004 report. The report represents a regular and rolling update of basic information and policies at Logan, and normally does not represent a make-or-break review of a particular capital project. This lack of immediate controversy may explain why the number of comments has been so small, typically less than a dozen or even a half-dozen.

However, the Data report has invented for itself an additional and unexpected role, which is a recognized use by MassPort personnel as a reference document for data, trend lines and other basic information. The fact that a paper document would achieve such recognition in the age of the Internet tells us something about the utility and accessibility of the report, while suggesting certain deficiencies of the Internet as an organized data source.

Furthermore, the fact that MassPort personnel may find the document a useful reference suggests the possibility that other government officials and citizens may be doing the same thing – even if they do not comment during the official MEPA comment period. If this is true, MEPA should take notice of the information and organization of the MassPort report to identify what special features result in people quietly seeing the use for the document beyond its formal MEPA submission. Stated another way, most EIRs prepared for MEPA review also receive minimal public comments, but almost all of them tend to be forgotten once the MEPA certificate is issued.

I have saved a number of old EIRs over the years, but rarely do I refer to them after a project review, and seldom with a sense that the document is providing me with important information. What I am suggesting is that the the Massport Environmental Data report may offer some valuable ideas on how to make EIRs more interesting and useful, and that this should be a goal for MEPA under Chapter 30, Section 62.

One last, more cosmic rumination. With all of the news last summer of bridge collapses and potential future failures, as well as difficulties with the Big Dig tunnels and other infrastructure, I noted that except for one cracked beam on the Tobin Bridge, MassPort had emerged relatively unscathed from both crises and concerns about inadequate maintenance and poor planning. I also noted that Mass Water Resources Authority similarly avoided any part in the infrastructure crisis.

By similar coincidence, I have noted that MPA and MWRA are able to produce and make public information on past and projected performance, as well as plans for future actions which go far beyond the capabilities of other state agencies such as Mass Highway, DCR, MBTA, the Turnpike Authority. Political turmoil and interference seems to be the case for these latter agencies, while MPA and MWRA appear to float above the chaos. I recognize this even while admitting my natural

Massport is not aware of a proposal to use an expanded Boston Common Underground Garage as a satellite parking facility.

I-001-008

Historical trend data for all ground transportation services, including length of parking stay, are provided in *Chapter 5, Ground Transportation* and the associated technical appendix for each EDR/ESPR. These data date back to 1990, which is as far back as data are available.

Extrapolation of passenger and parking trends are provided as part of the ESPR, published once every five years. The *2004 ESPR* reported on the projected air passengers and parking demand in 2020. Since air passenger forecasts are only updated as part of the ESPR, interim parking demand projections are not included in EDRs. The *2009 ESPR* will include parking demand projections.

I-001-009

Massport has a number of existing noise mitigation programs. These include one of the most extensive residential and school sound insulation programs in the nation (with 10,461 dwelling units and 36 schools in East Boston, Roxbury, Dorchester, Winthrop, Revere, Chelsea, and South Boston having been sound insulated to date), noise rules that restrict nighttime operations of all remaining Stage 2 aircraft between the hours of 11:00 PM and 7:00 AM, and noise abatement flight tracks designed to minimize impacts to communities by optimizing over-water aircraft operations (especially during nighttime hours). In 2004, the Federal Aviation Administration (FAA), Massport, and the Community Advisory Committee (CAC) jointly commenced a study to determine whether changes to existing noise abatement flight tracks might further reduce noise impacts. Phase 1 of the study was completed in the fall of 2007 and has already been partially implemented, with some communities on the South and North shores benefiting from reduced aircraft overflights. Phase 2 of the study, which is known as the Boston Logan Airport Noise

preference for elected rather than appointed officials, for elected mayors rather than City Managers, and for generally democratic forums for the conduct of government business. I also recognize that Massport was not always so well intentioned or responsive, since I remembered vividly the imperial days of Ed King. Similarly, MWRA under Court Order slipped into an imperial phase when it sought to impose a sludge landfill on Walpole, and a very angry citizen response stopped the proposal in its tracks, with the then-Executive Director getting his head handed to him.

I remember talking later with MWRA CEO Doug McDonald about how he learned from Walpole that even independent authorities like MWRA needed to keep open communication lines to communities and citizens. By making the effort, MRWA in some cases was able to do a better job of it than local governments.

There is a special mix of conditions which at times allows autonomous authorities to respond with sensitivity, and I am not sure of the reasons or the magical brew or ingredients which allows this to happen. However, I believe there has been a positive tradition at MassPort over the past two decades, a tradition which would allow the Authority to take the Runway 14-32 problem and see it through to a successful conclusion -- without the virtual bloodletting that occurred with your sister Authority through the Walpole experience.

cc. State Representative Denise Provost
State Representative Robert DeLeo, Chairman Ways and Means
Mayor Joseph Curtatone, Somerville
James Hunt, Boston Environmental/Energy Services
John Moot, President, Assoc of Cambridge Neighborhoods
Stash Horowitz, Vice President, Assoc of Cambridge Neighborhoods
Craig Kelley, Cambridge City Councilor
Wig Zamore, Somerville STEP
Fred Salvucci, CAC
Commissioner Laurie Burt, DEP
John Silva, FAA/DOT, Burlington
Vivien Li, Boston Harbor Association

Study (BLANS), will conduct a more detailed analysis of some of the flight track changes that were developed during Phase 1. Phase 2 began in spring of 2007 and is ongoing. Further detail is provided in *Chapter 6, Noise Abatement* of the *2007 EDR*.

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October 23, 2007

Massachusetts Environmental Policy Act (MEPA)
Executive Office of Environmental Affairs
100 Cambridge Street, 9th Floor
Boston, MA 02114

Attn: Ian A. Bowles, MEPA Office

Subject: EOEA #3247-Logan Airport 2006 Environmental Data Report (EDR)

Dear Secretary Bowles:

These comments are being transmitted by email and fax. A hard copy will also be sent.

I have reviewed the 2006 Environmental Data Report (EDR), EOEA #3247 and offer the following comments and questions.

The following typographical errors were observed:

1. On pages 3-6 and 3-7, the paragraph with respect to the North Service Area (NSA) was repeated.

I-002-001 2. In Table 6-5, the Runway 4R/L PRAS departures were reported as Z3.8%. I assume it should have been 3.8%, but that should be verified.

I-002-002 3. In Appendix K, the shellfish agreement is written for Runway 22L. However, from the body of the report, it appears that the RSA (runway safety area), for which this agreement was written, was for Runway 22R. It is assumed that this was a typographical error.

I offer the following comments on Ground Transportation issues:

For flights before 7 am, it is nearly impossible to get to the airport by MBTA. A person with an early flight is forced to use a cab. Since the number of extra-early flights
I-002-003 continues to increase, as does the price of parking and gasoline, Massport should look

I-002-001

Correction noted. The 2006 Effective Usage for Runway 4R/L, listed in *Figure 6-5, Effective Jet Aircraft Runway Use in Comparison to PRAS Goals*, was indeed 3.8 percent, 1.8 percent less than the PRAS Effective Usage Goal for Runway 4R/L Departures.

I-002-002

The Agreement Regarding Shellfish Relocation Plan relates to the Runway Safety Area improvements for Runway 22L.

I-002-003

Logan Airport is accessible via public transportation in the early hours of the morning. Logan Express services are the earliest. Braintree Logan Express service begins at 3:15 AM on weekdays and 3:45 AM on weekends. Framingham Logan Express service begins at 4 AM daily. Peabody Logan Express service begins at 4:15 AM. Woburn Logan Express Service begins at 3:30 AM on weekdays and 4:00 AM weekends. Silver Line Service begins as early as 5:50 AM, and the Blue Line runs from 6:00 AM to 12:30 AM each day of the week. Please see http://www.massport.com/logan/getti.html for more detail.

Massport's new Sunrise Shuttle provides shuttle services between 3:00 AM and 5:30 AM for Airport employees who reside in East Boston to meet a portion of this early morning demand before MBTA service is in operation.

I-002-003 into ways of addressing this chronic problem. In particular, they could work with the MBTA to provide some kind of service to the airport at night, or they could look into special bus service from various parts of the city to the airport, as other airports do.

I-002-004 I note, with amusement, that Terminal A took LEED (TM) credit for bike racks. As a regular city cyclist, I would consider biking to the airport if there were a safe method. The roadway design is most unfriendly for this purpose, and I know I have seen signs that specifically prohibit them. How do the cyclists who use the racks at Terminal A get there?

I-002-005 With respect to Water Quality, why were the three missing data points in the summer?

With respect the the Noise sections (6 and H), I offer the following comments and questions:

I-002-006 Since the modeling process is computing DNL for each day, should not the actual meteorological data be used, instead of an annual average?

I-002-007 With respect to Figure 6-4, it would seem that profile data are being used at 160,000 ft from the runway. Is that the current "cut-off" for track data?

I-002-008 It is disturbing to note, from Table 6-6 that there are 100 to 200 people exposed to 75 to 80 DNL, and an additional 600 to 700 exposed to 70 to 75 DNL, according to the model. What portion of complaints are from people in these extra-high noise areas?

I-002-009 It is interesting to note that, while air and water quality measurements are taken as true, with models needing work, the same is not true for noise measurements.

I-002-010 How will the new system determine what is an aircraft for use in computing "aircraft-only" DNL? Is the vendor using matching to radar, or 1/3-octave band information, or time sequencing of noise events, or a combination of these? Surely, Massport knows, in general, what was delivered.

I-002-011 I note that total measured noise was not included in the reporting for the noise monitors (Table 6-8). One cannot determine to what extent gaps in data, to separate noise events, would close the discrepancies observed for close-in sites. Given the concerns about the measurements and portions data due to aircraft only, one would have thought this data would not be dropped

I-002-012 The comparison between measured and modeled DNL for 2006 continues to show "errors" ranging from 3.1 dBA (East Boston Yacht Club-Site 12) to -13.6 (Nahant--Site 18). While "average deviations" are discussed, it should be noted that there is no underprediction outside of 3 miles (per the chart). To what does Massport attribute the wide range of errors in prediction close-in to the airport (-3.0 to +3.1 dBA)?

I-002-004

There are many options for getting to and from Logan Airport with a bicycle: one may bring a bike by subway, ferryboat, bus or car, or ride it to the Airport on service roads and paths. One may also call 1-800-23-LOGAN for latest updates on bicycle access to the Airport. The Massachusetts Bicycle Coalition (MassBike) has a useful page with information and detailed maps for bicyclists interested in getting to and from Logan Airport by bicycle. Massport encourages bicyclists to use this resource available at www.massbike.org/info/airport.htm.

I-002-005

Water samples could not be collected from the North, West, Porter, or Maverick Street Outfalls on three occasions in the summer of 2006 due to exceptional weather conditions.

I-002-006

Chapter 6, Noise Abatement of the *2007 EDR* reports on the annual average noise levels for the communities surrounding Logan Airport. RealContoursTM enables Massport to model each day which is a convenient way to break up the large amount of data available. This allows Massport to use all of the track and fleetmix data for each day and then average the results from all of the days to get the annual average results. The annual average weather conditions are used to provide consistency between the modeling done for each day.

I-002-007

The 2007 radar data was processed out to 14,000 feet in altitude and 30 nautical miles (182,284 feet) from the Airport.

I-002-008

A summary of noise complaints received in 2006 compared to 2005 is provided in Table H-7 of *Appendix H, Noise Abatement* of the *2006 EDR*.

I-002-013 Why is the Winthrop highest measured site, #4, off by 3 dB (a factor of two in operations)? Based on everything reported to the public, the highest levels should be the easiest to get right.

I-002-014 What is the statistical error associated with the modeled noise data?

What is the statistical error associated with the measured noise data?

I-002-015 With respect to Figures 6-15 and 6-16, what would one "expect" to see if PRAS goals were met and PRAS recommendations were followed?

I-002-016 Data in the Flight Track Monitoring Report are not compared with the previous report. It is noted that Runway 4R/L shoreline crossings are not above 6000 ft for about 50% of flights for the Swampscott and Cohasset gates. Why do so few meet the criterion?

I-002-017 In what ways does Massport work with the FAA and/or airlines to improve compliance with stated procedures?

I-002-018 It is disturbing to observe that more operations are occurring in the nighttime hours. The numbers in Table 6-1 do not add up. From Table 6-1, an average of on the order of 114 commercial jet operations occur at night. Assuming half arrivals and departures, that could be 52 awakenings in a night at some locations.

I-002-019 When comments are made in the text comparing two or more years' worth of data, the supporting data should have been included in the tables of the current document. In particular, comparisons of mulitiple year data were missing for time above.

Thank you for giving me the opportunity to comment on this report.

Sincerely,

Nancy S. Timmerman, P.E.

cc: J. Wilkins

Letter to MEPA Office/EOEA #3247--2006EDR

The table shows that complaints from people in Winthrop increased by 30 percent from 2005 to 2006. During this same period, complaints from people in Revere tripled. The complaint level in East Boston remained constant from 2005 to 2006.

I-002-009

Noise measurements from the new Noise Monitoring System (NOMS) are expected to be more accurate because it has improved measurement equipment, improved flight tracking, and improved aircraft event detection.

I-002-010

One of the major goals of the new system and monitors was a deeper more accurate identification of the aviation noise component at the monitors. Noise measurements from the new NOMS are expected to be more accurate because it has improved measurement equipment, improved flight tracking, and improved aircraft event detection. These improvements will allow the vendor to loop through the detailed time histories of events to match with the time history of each flight using calculated slant distances and point of closest approach calculations. The system will determine the best match and mark the event as aircraft generated.

I-002-011

Comment noted and the *2007 EDR* continues to report measured aircraft noise results.

I-002-012

It is noted that there is no overprediction outside of 3 miles from the Airport (i.e. Site 26 modeled value is 2.2 dB less than the measured value). Massport attributes the wide range of differences due to measurement data issues and unique conditions at several of the

measurement sites. *Chapter 6, Noise Abatement* of this *2007 EDR* shows that measured values at almost all of the sites decreased or changed due to the upgraded measurement system. Massport also strives to improve its modeling and use of adjustments to account for its unique situation (where the monitors and the Airport are separated by water). *Chapter 6, Noise Abatement* of this *2007 EDR* presents modeled results that better match the measured data.

I-002-013

Site 4 in Winthrop is exposed to arrivals on Runway 27 and departures from Runway 9. Real ContoursTM and Real ProfilesTM allows for better modeling of the aircraft in this area. However adjustments due to overwater propagation and the adjustment for arrival noise contributed to overprediction of noise at this site in 2006. To correct this, the arrival noise adjustment was not applied to the 2007 results and therefore there is better agreement between the measured and modeled noise levels at this site in 2007.

I-002-014

For sites more than 3 miles from the Airport, the standard deviation of the modeled and measured noise data is 8 db and 6 dB, respectively. For sites within 3 miles of the Airport, the standard deviation of the modeled and measured noise data is 5.4 db and 4.4 dB, respectively.

I-002-015

If Preferential Runway Advisory System (PRAS) goals were met, a longer contour out over Boston Harbor toward Hull and a reduction in the contour along Revere and South Boston would be expected due to Runway 33L arrivals. The contour would also expand into Chelsea due to the increase in arrivals to Runway 15R. Departures would cause increases in South Boston due to Runway 27 and in East Boston and Chelsea due to Runway 33L. Contours out over Boston Harbor would

decrease from Runway 22L/R departures but increase due to Runway 15R departures.

I-002-016

For the Hull - 2 and Cohasset gates there was an error in the process. These gates had 100 percent compliance and this has been corrected for the *2007 EDR*. The 54.7 percent compliance for the Swampscott gate is due to aircraft turning immediately after passing the Nahant gate and crossing the shoreline too early.

I-002-017

Massport continually works with the FAA and airlines on compliance with procedures that relate to aircraft noise. Since 1982 Massport has used PRAS which is a computer program that recommends to FAA air traffic controllers runway configuration options that will meet weather and demand requirements and provide an equitable distribution of the Airport's noise impacts on surrounding communities. Massport continually monitors compliance with the PRAS goals for runway use. As detailed in *Chapter 6, Noise Abatement* of the *2007 EDR*, the PRAS system has been updated over the years, with the most recent update occuring in 2007, and Massport plans to reevaluate the PRAS goals as part of the Boston Logan Airport Noise Study (BLANS). Massport has also supported the FAA in its continuous evaluation of the Runway 27 corridor (all jets departing Runway 27 fly heading 273 degrees and turn left over the GARVE waypoint and continue along a 235 degree heading which determines a small well defined corridor) and has strived to work with the airlines to comply with this procedure.

I-002-018

While nighttime commercial operations increased slightly in 2006,

nighttime operations for GA aircraft as a whole, and GA operations using Stage 2 aircraft, decreased. This is beneficial in terms of noise because Stage 2 aircraft (aircraft weighing less than or equal to 75,000 pounds) are exempt from meeting newer federal Stage 3 noise limits and therefore are louder than Stage 3 aircraft. Most Stage 2 aircraft are used in GA or for small commercial activities such as transporting checks between Federal Reserve Banks. The error noted in Table 6-1 has been corrected for the *2007 EDR.*

I-002-019

Data showing the amount of time that aircraft noise is higher than each of three predefined threshold sound levels (referred to generally as Time Above (TA) for a given year is provided in the EDR for that year. Historical TA data is not included in the EDRs in full, however, where TA data for a particular site is compared to the previous years data the TA data is included in the text.

C

Proposed Scope for the 2008 EDR

PROJECT NAME:	*Logan Airport 2008 Environmental Data Report* (*2008 EDR*)
PROJECT LOCATION:	East Boston, Massachusetts
EOEEA NUMBER:	3247
PROJECT PROPONENT:	Massachusetts Port Authority (Massport)

Massport respectfully submits this proposed scope for the *Logan Airport 2008 Environmental Data Report* (*2008 EDR*) for public review and comment. At the time the *2007 EDR* was filed, Massport was in the process of examining ways to streamline development of the *2008 EDR* and produce a more concise, but equally informative, document. Prior to beginning work on the *2008 EDR*, Massport will consult with the Executive Office of Energy and Environmental Affairs (EEA) to discuss proposed strategies for streamlining development of the *2008 EDR*.

Purpose of the *Logan Airport 2008 Environmental Data Report*

The *2008 EDR* will provide an annual update on conditions at Logan Airport for calendar year 2008. The EDR will continue to serve as a background/context against which projects at Logan Airport can be evaluated. It also will report on the cumulative effects of Logan Airport operations and activities, compared to 2008.

Contents of the *2008 Environmental Data Report*

The *2008 EDR* will report on 2008 passenger and aircraft operation activity levels. This will be followed by a status report on Massport's proposed planning initiatives and projects. The technical reports in the Environmental Data Report will include indicators of noise, ground access, air quality, water quality, environmental compliance and project mitigation tracking. Each chapter's contents are described below.

1. Introduction/Executive Summary

This chapter of the *2008 EDR* will include:

- Overview of Logan Airport and place it in its environmental, geographic, and regulatory context
- Overview of the EDR/Environmental Status and Planning Report (ESPR) cycle
- Summary of activity levels and operations
- Overview of the Logan Airport planning initiatives and projects
- Summary of regional and ground transportation, noise, air quality, and water quality/environmental compliance
- Overview of sustainability initiatives at Logan Airport
- Description of the organization of the *2008 EDR*

2. Activity Levels

A primary purpose of this chapter will be to report on airport activity levels for 2008, including:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport
- Passenger activity levels
- Cargo and mail
- Compare 2008 aircraft operations, cargo/mail operations, and passenger activity levels to 2007 activity levels
- Report on national aviation trends in 2008 and compare to trends at Logan Airport

3. Airport Planning

Massport continues to assess planning strategies for improving Logan Airport's operations and services in a, safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport also must accommodate and guide tenant development. This chapter will describe the status of planning initiatives for the following areas:

- Terminal Area
- Airside Area
- Service and Cargo Areas
- Airport Buffers and Landscaping

The chapter also will report on the status of public works projects implemented by other agencies within the boundaries of Logan Airport.

4. Regional Transportation Context

The *2008 EDR* will describe Logan Airport's role in the region's intercity transportation system by reporting on the following:

<u>Regional Airports</u>

- 2008 regional airport operations, passenger activity levels, and schedule data within an historical context

- Status of plans and new improvements as provided by the regional airport authorities
- Ground Access improvements to the regional airports
- The role that Worcester Regional Airport and Hanscom Field play in the regional aviation system and Massport's efforts to promote these airports

Regional Transportation System

- Massport's efforts in strengthening the regional transportation system
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations
- Report on metropolitan and regional rail initiatives and ridership

5. Ground Transportation

The chapter will report on 2008 conditions and provide a comparison of 2008 findings to those of 2007 for the following:

- High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Scheduled, Unscheduled, Water Transportation, and Logan Express)
- Logan Airport Employee Transportation Management Association (Logan TMA) membership and services
- Logan Airport gateway volumes
- On-airport traffic volumes
- On-airport vehicle miles traveled (VMT). VMT will be calculated using the updated model created in 2004 that is based on the full build roadway network
- Parking demand and management (including rates and duration statistics)
- Ground access management strategy
- Passenger and employee surveys

6. Noise Abatement

This chapter will provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter will report on 2008 conditions and compare 2008 conditions to those of 2007 for the following:

- Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and any qualifying Stage IV aircraft
- Nighttime operations
- Runway utilization (report on aircraft and airline adherence with runway utilization goals)
- Preferential runway advisory system (PRAS) compliance
- Flight tracks, including a discussion of the update on the Standard Terminal Automation Replacement System (STARS) radar and consolidation of the Boston Terminal Radar Approach Control (TRACON) at Merrimac, plus Massport's installation and use of PASSUR data

The chapter will report on 2008 conditions and compare those to 2007 conditions for the following noise indicators:

- Using the Federal Aviation Administration's (FAA) most current version of the Integrated Noise Model (INM), and RealContours™ and RealProfiles™, produce an accurate set of Day-Night Sound Level (DNL) noise contours. Adjustments made to account for over-water sound propagation and the propagation of sound to areas of higher terrain will be reported
- Noise-impacted population
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of RealContours™ and RealProfiles™
- Cumulative Noise Index (CNI)
- Times-Above for 65, 75, and 85 dBA threshold values
- Installation and benefits of the new noise monitoring system
- Flight track monitoring noise quarterly reports

The chapter will also report on noise abatement efforts and provide a status update on the new noise and operations monitoring system.

7. Air Quality/Emissions Reductions

This chapter will begin with an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The chapter will discuss analysis methodologies and assumptions and report on 2008 conditions using the most recent versions of the Emissions Dispersion Modeling System (EDMS) and MOBILE motor vehicle emissions. The chapter will include:

- Emissions inventory for carbon monoxide (CO)
- Emissions inventory for oxides of nitrogen (NO_x)
- Emissions inventory for volatile organic compounds (VOCs)
- Emissions inventory for particulate matter (PM)
- Nitrogen dioxide (NO_2) monitoring
- NO_x emissions by airline

This chapter will also report on the following air quality initiatives (AQI) for 2008:

- Air Quality Initiative Tracking
- Massport's and Tenant's Alternative Fuel Vehicle Programs
- The status of other Logan Airport air quality studies undertaken by Massport or others

This chapter will include an inventory of greenhouse gas (GHG) emissions from Logan Airport in 2008. GHG emissions will be quantified for aircraft, GSE, motor vehicles and stationary sources using emission factors and methodologies outlined in the Greenhouse Gas Emissions Policy and Protocol issued by EEA. The results of the 2008 GHG emissions inventory will be compared to the 2007 results.

8. Water Quality/Environmental Compliance and Management

This chapter will report on the 2008 status of:

- National Pollutant Discharge Elimination System (NPDES) Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility
- Jet fuel usage and spills
- Massachusetts Contingency Plan (MCP) Activities
- Tank Management
- Update on the environmental management plan

The chapter will also present a discussion of the following topics:

- Fuel spill prevention
- Future stormwater management improvements (if any)
- Future MCP and tank management activities

9. Project Mitigation Tracking

This chapter will report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone Massachusetts Environmental Policy Act (MEPA) review and have commenced construction. The mitigation commitments were made in the Section 61 Findings for the following projects will be reported:

- West Garage/Central Garage
- International Gateway
- Runway Ends 22R and 33L Safety Improvements
- Replacement Terminal A
- Logan Airside Improvements Planning

This chapter will update the status of Massport's mitigation commitments and also will identify projects for which mitigation is complete. Those completed projects will not be reported on in subsequent EDRs.

Appendices

MEPA Documentation

These appendices will include a copy of the Secretary's Certificate and comment letters received on the *2007 EDR*. Individual responses to items raised in the Secretary's Certificate on the *2007 EDR* and comments in reviewers' letters will be provided. A distribution list for the *2008 EDR* (indicating those receiving documents or CDs) will be provided.

Supporting Technical Documentation

Supporting technical appendices will be provided as necessary.

D
Distribution

This *2007 Environmental Data Report* (*2007 EDR*) has been distributed to federal, state, and city agencies and to parties listed in this appendix. The list includes those entities that the Massachusetts Environmental Policy Act (MEPA) requires as part of the review of the document, representatives of governmental agencies, commentors on the *2006 EDR*, and community groups concerned with airport activities.

The *2007 EDR* also is available on Massport's website at www.massport.com and electronically on compact disc (CD). Limited CD or printed copies of the *2007 EDR* may be requested from Laurie Goodrich, Massport, Suite 200S, Logan Office Center, One Harborside Drive, East Boston, MA 02128, telephone (617) 568-3507, e-mail: lgoodrich@massport.com.

Printed and electronic copies of this report are available for review at the following public libraries:

Table D-1 Libraries

	Library	Address		Library	Address
P,C	Boston Public Library Main Branch	666 Boylston Street Boston, MA 02117	P,C	Boston Public Library Charlestown Branch	179 Main Street Charlestown, MA 02129
P,C	Boston Public Library Connolly Branch	433 Centre Street Jamaica Plain, MA 02130	P,C	Boston Public Library East Boston Branch	276 Meridian Street East Boston, MA 02128
P,C	Boston Public Library Orient Heights Branch	18 Barnes Avenue East Boston, MA 02128	P,C	Boston Public Library South Boston Branch	646 East Broadway South Boston, MA 02127
P,C	Bedford Public Library	7 Mudge Way Bedford, MA 01730	P,C	Cary Memorial Library	1874 Massachusetts Avenue Lexington, MA 02420
P,C	Chelsea Public Library	569 Broadway Chelsea, MA 02150	P,C	Concord Public Library	129 Main Street Concord, MA 01742
P,C	Lincoln Public Library	Bedford Road Lincoln, MA 01773	P,C	Milton Public Library Main Branch	476 Canton Avenue Milton, MA 02186
P,C	Quincy Public Library Thomas Crane Branch	40 Washington Street Quincy, MA 02169	P,C	Revere Public Library	179 Beach Street Revere, MA 02151
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C CD sent
P Printed volume sent

Some parties listed in Table D-2 have been provided a hard copy of the document along with a CD of the complete document. A second group of parties have been provided with a CD only.

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Chelsea, MA 02150

■ Jamaica Plain Community

C Nancy Brooks and Maura Meagher
92 Bourne St
Jamaica Plain, MA 02130

C Susan Morony
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Jamaica Plain, MA 02130

C Marvin Kabakott
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Jamaica Plain, MA 02130

C Robyn Ochs
79 Eastland Road
Jamaica Plain, MA 02130

C Martha Merson
19 Roseway St
Jamaica Plain, MA 02130

C Craig Sonnenberg
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C Thomas Briand, President
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C Mary Catino
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East Boston, MA 02128

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C Mary Ellen Welch
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East Boston, MA 02128

P,C William Longfield
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East Boston, MA 02128

C James Manganello, Executive Director
East Boston Community Information &
Referral Center
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East Boston, MA 02128

C Ron Hardaway
118 Bayswater Street
East Boston, MA 02128

C Karen Buttiglieri
56 Beachview Road
East Boston, MA 02128

C Debra Cave
ONE East Boston
106 White Street
East Boston, MA 02128

C Lucy Ferullo
23 Haynes Street
East Boston, MA 02128

C Roberta Horn
65 St. Andrews Road
East Boston, MA 02128

C George Loring
Bremen Street Park Site Committee
237 Marion Street
East Boston, MA 02128

C Richard Lynds
Executive Director,
East Boston Foundation
46 BenningtonStreet
East Boston, MA 02128

C Gail Miller
232 Orient Ave
East Boston, MA 02128

C John Dudley
Executive Director
East Boston Chamber of Commerce
296 Bennington Street
East Boston, MA 02128

C Alice Christopher
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C Tom Bruno
Orient Heights Neighborhood Association
51 Annavoy Street
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C Ida Lamattina
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Gove Street Citizens Committee
123 Cottage Street
East Boston, MA 02128

C Karen Maddalena
Chairperson
Jeffries Point Neighborhood Assoc.
4 Lamson Street
East Boston, MA 02128

C Clark Moulaison
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East Boston, MA 02128

C Jack Scalcione
Commander, East Boston Veteran's Council
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Table D-2 Distribution (Continued)

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C Joe Mason
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C Fran Riley
193 Trenton Street
East Boston, MA 02128

C Richard Salini, Chair
East Boston Piers PAC
155 Webster Street
East Boston, MA 02128

C Vincent R. Tino
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East Boston, MA 02128

C John Cradock
East Boston Neighborhood Health Center
10 Gove Street
East Boston, MA 02128

C Fran Rowan
7 Thurston Street
East Boston, MA 02128

C Diane Modica
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East Boston, MA 02128

C Maria Conti
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C Sheldon Kovitz, President
Point of Pines Beach Assoc.
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C Joseph James
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C Joseph Felzani
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C James Furlong
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Table D-2 Distribution (Continued)

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C Lucky Devlin
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C Mr. William Spain
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- Winthrop Community

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C Richard D. Dimes
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C Tony Marmo
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C Eric Gaynor
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Winthrop, MA 02152

C Robert Pulsifer
1050 Shirley Street
Winthrop, MA 02152

C Cindy Levins,Vice President
Winthrop Chamber of Commerce
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Winthrop, MA 02152

C Marie Turner
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Winthrop, MA 02152

C John Vitagliano
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Winthrop, MA 02152

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West Roxbury, MA 02132

C Carl Corcy
88 Bellevue Street
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C Keith Davison
37 Hastings Street, #206-ME
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Table D-2 Distribution (Continued)

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C Richard Domas
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Table D-2 Distribution (Continued)

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C MAPC MetroFuture Steering Committee
Somerville Transportation Equity Partnership
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MBTA Rider Oversight Committee

C CD sent
P Printed volume sent

E

Activity Levels

This appendix provides detailed tables in support of *Chapter 2, Activity Levels*:

- Table E-1 Logan Airport Historic Air Passenger and Operations Data
- Figure E-1 Logan Airport Historic Air Passenger and Operations Data
- Table E-2 Logan Airport Changes in Domestic Passenger Operations by Carrier
- Table E-3 Logan Airport Changes in International Passenger Operations by Carrier
- Table E-4 Logan Airport Scheduled Passenger Departures by Destination

Table E-1 Logan Airport Historic Air Passenger and Operations Data

Year	Operations	Air Passengers	Year	Operations	Air Passengers
1980	258,167	14,722,363	1994	458,623	24,468,178
1981	251,961	14,827,684	1995	466,327	24,192,095
1982	244,468	15,867,722	1996	456,226	25,134,826
1983	288,956	17,848,797	1997	482,542	25,567,888
1984	318,959	19,417,971	1998	507,449	26,526,708
1985	349,518	20,448,424	1999	494,816	27,052,078
1986	363,995	21,862,718	2000	487,996	27,726,833
1987	414,968	23,369,002	2001	463,125	24,474,930
1988	407,479	23,732,959	2002	392,079	22,696,141
1989	388,797	22,272,860	2003	373,304	22,791,169
1990	424,568	22,878,191	2004	405,258	26,142,516
1991	430,403	21,450,143	2005	409,066	27,087,905
1992	474,378	22,723,138	2006	406,119	27,725,443
1993	493,093	23,579,726	2007	399,537	28,102,455

Figure E-1 Logan Airport Historic Air Passenger and Operations Data

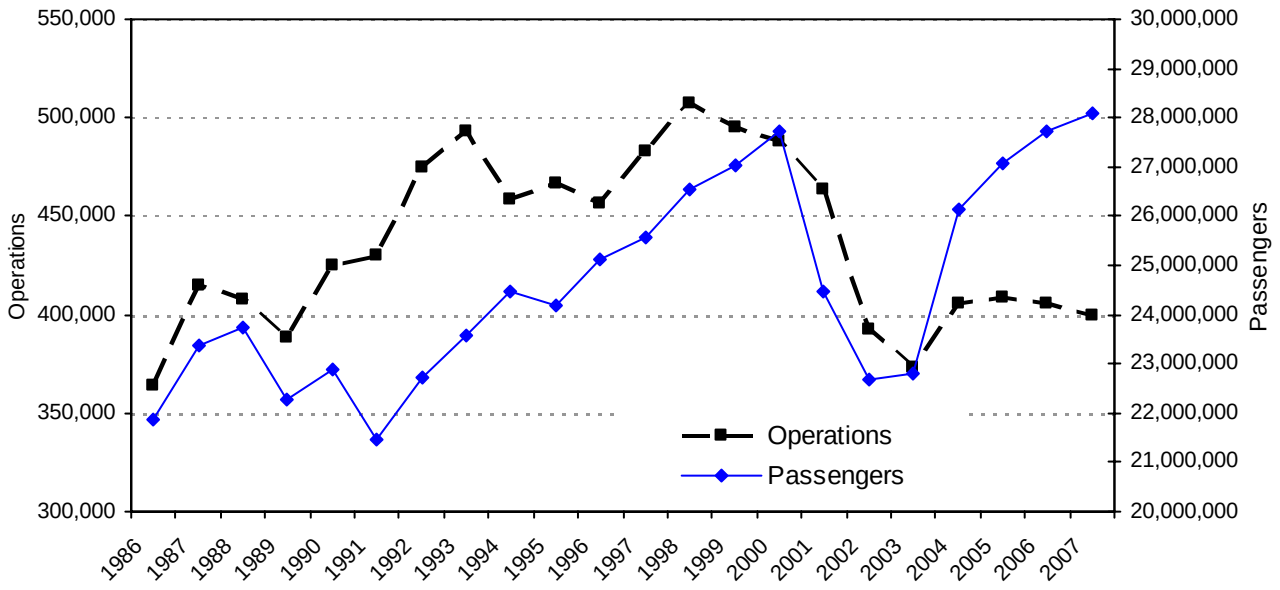


Table E-2 Logan Airport Changes in Domestic Passenger Operations by Carrier

Airline	2004	2005	2006	2007	2006-2007 Change	2006-2007 Percent Change
Scheduled Jet Carriers						
AirTran Airlines	12,618	14,580	19,761	18,685	-1,076	-5.45%
Alaska Airlines	1,111	1,088	1,097	1,423	326	29.72%
America West Airlines	5,922	4,467	4,220	2,874	-1,346	-31.90%
American Airlines	32,578	27,712	24,631	23,589	-1,042	-4.23%
American Trans Air	2,342	2,294				
Continental Airlines	13,575	13,546	13,972	14,090	118	0.84%
Delta Air Lines Mainline	15,279	14,317	18,472	21,799	3,327	18.01%
Delta Shuttle	10,237	9,588	9,000	9,114	114	1.27%
Delta Song Airways	11,693	12,483	4,408		-4,408	-100.00%
Delta Subtotal	37,209	36,388	31,880	30,913	-967	-3.03%
Independence Air	5,533	4,676	45		-45	-100.00%
JetBlue	9,080	15,069	31,993	34,933	2,940	9.19%
Midwest Express Airlines	2,851	3,570	4,287	4,672	385	8.98%
Northwest Airlines	11,242	9,685	8,652	8,368	-284	-3.28%
Spirit Airlines			683	1,796	1,113	162.96%
United Airlines	20,975	18,304	21,153	20,140	-1,013	-4.79%
US Airways	38,563	39,612	36,907	37,396	489	1.32%
Jet Subtotal	193,599	190,991	199,281	198,879	-402	-0.20%
Regional/Commuter Carriers						
ACJet (Delta Connection)	7,244					
ACJet (United Express)	1,442					
Air Wisconsin (United Express)	801	1,699				
Air Wisconsin (US Airways Express)		174	1,381	7,289	5,908	427.81%
Allegheny (US Airways Express)	1,789					
American Eagle Airlines	42,173	37,394	31,227	23,638	-7,589	-24.30%
Atlantic SE (Delta Connection)	362			182	182	
Big Sky Airlines				6,929	6,929	
Cape Air	24,816	25,018	27,278	26,546	-732	-2.68%
Chautauqua Airlines (American	1,533					
Chautauqua Airlines (Delta	2,116	1,938	1,882	2,187	305	16.21%
Chautauqua Airlines (United Express)		103		484	484	
Chautauqua Airlines (US Airways	8,899	7,852	8,954	3,117	-5,837	-65.19%
Colgan Air (US Airways Express)	11,546	12,583	13,088	14,004	916	7.00%
Comair Airlines (Delta Connection)	15,732	24,619	26,341	27,196	855	3.25%
Commutair (Continental Express)	6,256	12,544	8,297	2,843	-5,454	-65.73%
Freedom Airlines				610	610	
Mesa Airlines (Signature)			8		-8	-100.00%
Mesa Airlines (United Express)	145	1,376	3,806	2,348	-1,458	-38.31%
Mesa Airlines (US Airways Express)	401	4	8	72	64	800.00%
MidAtlantic Express	380	150	130	40	-90	-69.23%
Piedmont Airlines	1,529	3,165	2,870	1,496	-1,374	-47.87%
Pinnacle Airlines (Northwest Airlink)	1,300	5,034	3,912	3,547	-365	-9.33%
PSA (US Airways Express)		526	246	109	-137	-55.69%
Republic (US Airways Express)		46	260	731	471	181.15%
Shuttle America (US Airways Express)				646	646	
Trans States Airlines (United Express)	52		610		-610	-100.00%
Trans States Airlines (US Airways	1,756	2,978				
Regional/Commuter Subtotal	130,272	137,203	130,298	124,014	-6,284	-4.82%

Table E-2 Logan Airport Changes in Domestic Passenger Operations by Carrier (Continued)

Airline	2004	2005	2006	2007	2006-2007 Change	2006-2007 Percent Change
Non-Scheduled Operations (Charter)						
American Trans Air			4	14	10	250.00%
Boston Main		13	12		-12	-100.00%
Champion Air		21	56	68	12	21.43%
Gold Transportation				58	58	
Miami Air	34	30	52	94	42	80.77%
North American Airways	216	148	92	81	-11	-11.96%
OMNI Airlines		26	2	30	28	1400.00%
XTRA			46	23	-23	-50.00%
Trans Meridian		2				
World Airways	14	8	2		-2	-100.00%
Other Nonscheduled Carriers	159	77	103	202	99	96.12%
Non-Scheduled Subtotal	423	325	369	570	201	54.47%
Total Domestic Operations	324,294	328,519	329,948	323,463	-6,485	-1.97%

Source: Massport.
Note: Excludes private general aviation and all-cargo operations.

Table E-3 Logan Airport Changes in International Passenger Operations by Carrier

Airline	2004	2005	2006	2007	2006-2007 Change	2006-2007 Percent Change
Scheduled Jet Carriers						
Aer Lingus Shannon	1,096	1,016	1,020	1,221	201	19.71%
Aeromexico	649	534	210	131	-79	-37.62%
Air Canada	6,846	5,782	3,950	3,377	-573	-14.51%
Air France	1,362	1,334	1,207	957	-250	-20.71%
Air Jamaica	662	349				
Alitalia	894	986	810	886	76	9.38%
American Airlines	5,175	4,672	4,824	4,700	-124	-2.57%
British Airways	2,080	2,151	2,190	2,160	-30	-1.37%
Delta Air Lines	736	749	851	829	-22	-2.59%
Finnair		44	49	66	17	34.69%
FlyGlobespan				225	225	
Iberia Airlines				304	304	
Icelandair	892	811	807	869	62	7.68%
JetBlue			555	1,363	808	145.59%
SATA International Airlines	301	315	334	393	59	17.66%
Lufthansa German Airlines	1,526	1,564	1,522	1,515	-7	-0.46%
Northwest Airlines	730	727	734	1,081	347	47.28%
SWISS International (formerly Swiss Air)	714	704	708	727	19	2.68%
TACA	363	327	236		-236	-100.00%
TACV - Cabo Verde	157	154	139	165	26	18.71%
US Airways	2,048	1,607	1,208	1,133	-75	-6.21%
Virgin Atlantic Airways	860	724	727	732	5	0.69%
Jet Subtotal	27,091	24,550	22,081	22,834	753	3.41%
Regional/Commuter Carriers						
ACJet (Delta Connection)	1,688					
Air Canada Regional	5,060	5,120	7,676	8,499	823	10.72%
American Eagle Airlines	3,306	4,637	2,712	3,312	600	22.12%
Big Sky Airlines				1,468	1,468	
Comair Airlines (Delta Connection)	1,730	3,355	2,534	2,195	-339	-13.38%
Regional/Commuter Subtotal	11,784	13,112	12,922	15,474	2,552	19.75%
Non-Scheduled Operations						
American Trans Air	114	26	6	6		
Aviation Technology		160				
Boston Main		6				
Cayman Airways	7	55	60	16	-44	-73.33%
Champion Air		18	2		-2	-100.00%
LACSA Airlines	14	18	12		-12	-100.00%
Miami Air	14	18	63	232	169	268.25%
North American Airways	441	323	275	112	-163	-59.27%
OMNI Airlines		10				
Pan American Airways	389					
Planet Airways		14				
Ryan International	115	303	143		-143	-100.00%
Saudi Arabian			10	21	11	110.00%
Trans Meridian	44	8				
Viet Nam Airlines		1				
XTRA Aviation			145	103	-42	-28.97%
Other Nonscheduled Carriers	49	21	11	37	26	236.36%
Non-Scheduled Subtotal	1,187	981	727	527	-200	-27.51%
Total International Operations	40,062	38,643	35,730	38,835	3,105	8.69%

Source: Massport.
Note: Both jet carriers and regional/commuter carriers scheduled and operated regional jet flights at Logan Airport in 2004-2007.

Table E-4 Logan Airport Scheduled Passenger Departures by Destination

Destination Airport	2004	2005	2006	2007	2006-2007 Change	2006-2007 Percent Change
Domestic						
New York La Guardia	13,709	13,368	12,619	12,579	-40	-0.31%
Washington National	10,572	10,697	9,587	9,594	7	0.07%
New York JFK	4,070	4,981	8,839	8,473	-366	-4.14%
Chicago O'Hare	8,446	7,421	7,251	7,422	171	2.36%
Philadelphia	8,942	7,021	7,107	6,442	-665	-9.35%
Baltimore	5,281	5,033	6,787	5,820	-967	-14.25%
Atlanta	5,194	6,016	5,742	5,777	35	0.61%
Washington Dulles	6,201	6,155	6,803	5,417	-1,386	-20.38%
Raleigh/Durham	4,106	4,115	5,054	4,322	-732	-14.49%
New York Newark	5,612	5,633	5,598	4,278	-1,320	-23.58%
Orlando	3,673	3,528	3,084	3,673	589	19.10%
Nantucket	4,406	3,445	3,619	3,501	-118	-3.27%
Charlotte	2,928	3,292	3,171	3,434	263	8.30%
Dallas/Fort Worth	4,362	3,545	3,445	3,155	-290	-8.43%
Buffalo	1,329	1,226	2,096	2,994	898	42.84%
Detroit	2,907	2,832	2,888	2,850	-38	-1.33%
Los Angeles	3,374	2,658	2,667	2,798	131	4.92%
San Francisco	3,083	2,593	2,179	2,619	440	20.19%
Fort Lauderdale/Hollywood	2,691	3,075	2,619	2,610	-9	-0.33%
Martha's Vineyard	3,304	2,227	2,610	2,557	-53	-2.01%
Denver	2,304	1,992	2,445	2,514	69	2.82%
Bangor	3,195	2,949	2,532	2,447	-85	-3.36%
Provincetown	2,169	1,657	2,062	2,277	215	10.45%
Pittsburgh	2,139	2,023	2,058	2,183	125	6.09%
Cincinnati	2,724	2,640	2,014	2,012	-2	-0.12%
Miami	2,183	2,075	2,101	1,946	-155	-7.38%
Houston Intercontinental	1,569	1,753	1,857	1,913	56	3.03%
Indianapolis	1,142	2,079	1,862	1,833	-29	-1.53%
Columbus	2,083	2,118	1,792	1,828	36	2.02%
Tampa	1,743	1,949	1,779	1,819	40	2.24%
Las Vegas	1,474	1,679	1,762	1,725	-37	-2.12%
Milwaukee	1,839	2,184	1,670	1,695	25	1.50%
Fort Myers	1,064	1,531	1,618	1,693	75	4.64%
Minneapolis	2,009	1,792	1,697	1,678	-19	-1.09%
Richmond	1,678	1,409	1,557	1,599	42	2.68%
West Palm Beach	1,348	1,131	1,492	1,479	-13	-0.85%
Cleveland	1,263	1,262	1,314	1,387	73	5.53%
Phoenix	792	944	1,322	1,277	-45	-3.43%
Rockland	1,360	1,375	1,357	1,268	-89	-6.53%
Rochester		1,183	1,562	1,264	-298	-19.09%
Albany	1,387	1,074	661	1,254	593	89.76%
Westchester County	1,908	2,258	2,053	1,233	-820	-39.95%
Hyannis	1,852	1,057	996	1,177	181	18.16%
Bar Harbor	1,374	1,153	1,179	1,176	-3	-0.27%

Table E-4 Logan Airport Scheduled Passenger Departures by Destination (Continued)

Destination Airport	2004	2005	2006	2007	2006-2007 Change	2006-2007 Percent Change
Domestic						
Syracuse	1,337	1,762	1,762	1,121	-641	-36.38%
St. Louis	1,678	1,462	1,523	1,089	-434	-28.52%
Chicago Midway	1,198	1,340	1,131	1,086	-45	-3.94%
Islip	1,042	1,579	1,192	1,030	-162	-13.57%
Memphis	702	1,035	1,053	1,007	-46	-4.34%
Presque Isle	1,028	1,018	1,018	1,004	-14	-1.38%
Seattle/Tacoma	999	609	394	975	581	147.46%
Newport News	428	670	948	945	-3	-0.36%
Trenton			61	943	882	1445.20%
Long Beach	692	853	840	813	-27	-3.18%
Myrtle Beach	135	265	265	730	465	175.53%
Salt Lake City	728	730	709	721	12	1.73%
Kansas City		239	513	715	202	39.46%
Jacksonville		426	722	712	-10	-1.33%
Watertown				707	707	
Rutland	627	644	626	704	78	12.48%
Harrisburg	932	887	744	685	-59	-7.87%
Norfolk	1,347	1,035	704	647	-57	-8.04%
Augusta	392	622	600	617	17	2.90%
Greensboro	1,177	1,122	657	600	-57	-8.72%
Akron/Canton	428	731	726	575	-151	-20.84%
San Diego	306	365	365	549	184	50.41%
Saranac Lake	275	800	940	544	-396	-42.08%
Oakland	487	852	813	518	-295	-36.29%
Burlington	1,098	1,631	931	452	-479	-51.48%
Nashville			318	422	104	32.70%
Allentown/Bethlehem		622	779	417	-362	-46.52%
Charleston	13	61	287	382	95	33.25%
San Jose	406	244	365	365		
Austin			352	365	13	3.69%
Savannah	43	78	278	348	70	25.13%
Dayton			98	270	172	175.07%
Portland				122	122	
Louisville				122	122	
Plattsburgh AFB				27	27	
Plattsburgh				26	26	
Sarasota		30	35	8	-27	-75.92%
Portland, ME	1,569	1,396		4	4	
New Orleans	244	191		4	4	
Wilkes-Barre Scranton		417				
Columbia	91					
Atlantic City	17					
Total Domestic	164,208	163,844	166,256	163,366	-2,890	-1.74%

Table E-4 Logan Airport Scheduled Passenger Departures by Destination (Continued)

Destination Airport	2004	2005	2006	2007	2006-2007 Change	2006-2007 Percent Change
International						
Toronto	3,693	3,880	4,054	4,235	181	4.48%
London Heathrow	2,174	2,136	2,153	2,151	-2	-0.09%
Montreal Dorval	1,891	2,575	1,836	1,959	123	6.71%
Halifax	2,271	1,892	1,605	1,622	17	1.07%
San Juan	1,515	1,240	1,292	1,413	121	9.40%
Ottawa	928	866	874	931	57	6.52%
Bermuda	580	518	513	685	172	33.56%
Paris De Gaulle	868	853	787	671	-116	-14.74%
Fredericton	732	687	365	579	214	58.63%
Quebec		30	213	579	366	171.83%
Frankfurt	563	574	544	549	5	0.92%
Amsterdam	366	365	365	549	184	50.41%
Reykjavik	353	361	361	418	57	15.67%
Shannon	436	735	796	383	-413	-51.92%
Milan Malpensa	362	344	335	361	26	7.68%
Zurich	357	357	361	361		
Aruba	274	339	289	304	15	5.04%
Dublin	113			231	231	
Manchester	184	239	244	214	-30	-12.30%
Munich	214	208	213	214	1	0.47%
Nassau	69	100	431	211	-220	-50.94%
Cancun	305	209	70	209	139	198.37%
Santo Domingo	192	174	160	170	10	6.07%
Madrid				157	157	
Ponta Delgada	61	39	109	148	39	35.78%
Saint Thomas	104	108	117	99	-18	-15.26%
Praia, Cape Verde		9	78	83	5	6.04%
Glasgow				79	79	
Rome Leonardo Da Vinci-Fiumicino	88	135	78	79	1	0.73%
Charlottetown				62	62	
Montego Bay	514	239	39	47	8	21.61%
Knock				44	44	
Stockholm-Arlanda			26	39	13	51.65%
Providenciales	43	44	48	39	-9	-19.35%
Lisbon			26	35	9	34.07%
Santiago				31	31	
Terceira			13	17	4	34.07%
Mexico City	331	235	52	17	-35	-67.03%
Las Palmas				13	13	
Grand Cayman		31	43	13	-30	-70.43%
Punta Cana			17	13	-4	-25.21%
San Salvador	187	178	131		-131	-100.00%
Vancouver	92	61				
Ilha Do Sal, Cape Verde	22	57				
Nykoping, Sweden		30				
Port Au Prince	56					
Lerwick Sumburgh Apt	31					
Total International	19,969	19,848	18,638	20,014	1,376	7.38%
Total Scheduled Carrier Operations	184,177	183,692	184,894	183,380	-1,514	-0.82%

Source: OAG Schedules.
Note: Annualized airline schedules do not reflect service disruptions of schedule changes that occurred during September as a result of September 11, 2001.

F

Regional Transportation Context

This appendix provides detailed tables in support of *Chapter 4, Regional Transportation Context*:

- Table F-1 Aircraft Operations by Classification for New England's Airports, 2000 to 2007
- Table F-2 Percentage Change in Aircraft Operations by Classification for New England's Airports, 2000 to 2007
- Scheduled Passenger Operations by Market and Carrier for New England's Regional Airports
  - Table F-3 Bradley International Airport, Connecticut
  - Table F-4 T.F. Green Airport, Rhode Island
  - Table F-5 Manchester-Boston Regional Airport, New Hampshire
  - Table F-6 Portland International Jetport, Maine
  - Table F-7 Burlington Airport, Vermont
  - Table F-8 Bangor Airport, Maine
  - Table F-9 Tweed-New Haven Airport, Connecticut
  - Table F-10 Worcester Regional Airport, Massachusetts
  - Table F-11 Hanscom Field, Massachusetts
  - Table F-12 Pease International Tradeport, New Hampshire

Table F-1 Aircraft Operations by Classification for New England's Airports, 2000 to 2007

Airport	Bradley Intl'	T.F. Green	Manchester-Bos Regional	Portland Intl' Jetport	Burlington	Bangor	Tweed-New Haven	Worcester Regional	Pease Intl' Tradeport	Hanscom Field	Subtotal	Logan[1]	Total
2000													
Commercial	132,062	103,750	61,506	47,609	45,745	21,446	5,260	4,029	6,104	6,572	434,083	452,763	886,846
General Aviation[1]	31,863	52,184	45,740	56,571	59,377	34,831	56,200	46,518	31,601	204,512	619,397	35,233	654,630
Military & Other	5,811	2,764	586	2,072	10,241	26,507	328	495	9,973	1,287	60,064	0	60,064
Total	169,736	158,698	107,832	106,252	115,363	82,784	61,788	51,042	47,678	212,371	1,113,544	487,996	1,601,540
2001													
Commercial	128,638	100,606	61,669	47,770	47,261	18,286	4,581	5,631	4,485	6,414	425,341	434,386	859,727
General Aviation[1]	30,478	45,095	44,358	62,014	61,986	35,230	56,092	45,464	30,148	197,770	608,635	28,739	637,374
Military & Other	5,913	2,635	607	2,259	11,821	26,623	437	917	8,221	1,252	60,685	0	60,685
Total	165,029	148,336	106,634	112,043	121,068	80,139	61,110	52,012	42,854	205,436	1,094,661	463,125	1,557,786
2002													
Commercial	113,194	96,595	62,346	45,899	38,929	24,412	3,827	4,062	5,059	6,603	400,926	366,476	767,402
General Aviation	27,838	45,473	29,549	57,720	59,679	35,711	62,163	52,277	28,333	210,221	608,964	25,596	634,560
Military & Other	6,085	2,587	376	2,162	12,167	27,297	593	418	8,220	1,424	61,329	0	61,329
Total	147,117	144,655	92,271	105,781	110,775	87,420	66,583	56,757	41,612	218,248	1,071,219	392,072	1,463,291
2003													
Commercial	103,917	84,301	68,184	42,658	38,293	25,626	3,705	868	4,552	2,956	375,060	344,644	719,704
General Aviation[1]	27,115	42,878	29,552	44,036	50,461	36,706	54,224	55,972	24,866	190,789	556,599	28,660	585,259
Military & Other	4,214	2,496	324	1,449	11,466	32,938	776	378	7,720	1,142	62,903	0	62,903
Total	135,246	129,675	98,060	88,143	100,220	95,270	58,705	57,218	37,138	194,887	994,562	373,304	1,367,866
2004													
Commercial	108,823	83,496	75,360	46,474	41,719	24,970	4,501	0	3,981	4,308	393,632	374,022	767,654
General Aviation[1]	32,269	34,878	27,438	41,547	54,709	29,884	58,881	61,343	25,962	175,301	542,212	31,236	573,448
Military & Other	4,100	346	749	1,338	12,404	29,676	1,010	530	7,797	1,195	59,145	0	59,145
Total	145,192	118,720	103,547	89,359	108,832	84,530	64,392	61,873	37,740	180,804	994,989	405,258	1,400,247
2005													
Commercial	119,048	88,374	76,342	42,661	43,987	25,976	6,137	2,727	3,197	3,627	412,076	377,830	789,906
General Aviation[1]	33,341	28,138	26,369	36,191	49,888	30,016	60,893	62,743	25,446	165,424	518,449	31,236	549,685
Military & Other	3,701	241	479	1,405	11,468	24,154	1,063	519	7,669	904	51,603	0	51,603
Total	156,090	116,753	103,190	80,257	105,343	80,146	68,093	65,989	36,312	169,955	982,128	409,066	1,391,194
2006													
Commercial	111,341	81,282	67,326	38,663	41,342	23,466	5,177	3,793	3,981	3,057	379,428	374,675	754,103
General Aviation[1]	34,548	25,510	25,074	35,572	44,471	29,848	51,702	56,770	25,962	167,560	497,017	31,444	528,461
Military & Other	4,348	229	738	1,536	9,299	22,359	1,157	609	7,797	1,433	49,505	0	49,505
Total	150,237	107,021	93,138	75,771	95,112	75,673	58,036	61,172	37,740	172,050	925,950	406,119	1,332,069
2007													
Commercial	107,097	80,525	69,134	41,450	39,928	22,571	4,594	3,162	4,270	3,477	376,208	370,905	747,113
General Aviation[1]	29,308	22,984	23,959	31,724	47,521	25,542	51,200	61,296	27,000	160,992	481,526	28,632	510,158
Military & Other	5,097	242	644	1,384	9,528	20,949	944	879	8,017	1,438	49,122	0	49,122
Total	141,502	103,751	93,737	74,558	96,977	69,062	56,738	65,337	39,287	165,907	906,856	399,537	1,306,393

Source: Massport, Federal Aviation Administration (FAA) Tower Counts, and individual airport records.
Note: 2001 General Aviation data for New Haven includes general aviation, military, and other operations.
1 General Aviation includes itinerant and local general aviation operations at the regional airports. There are no local (touch-and-go) training operations at Logan Airport.
2 Includes international operations.

Table F-2 Percentage Change in Aircraft Operations by Classification for New England's Airports, 2000 to 2007

Airport	Bradley International	T.F. Green	Manchester-Boston Regional	Portland International Jetport	Burlington	Bangor	Tweed-New Haven	Worcester Regional	Pease International Tradeport	Hanscom Field	Subtotal	Logan[2]	Total
2000 to 2001													
Commercial	-2.59%	-3.03%	0.27%	0.34%	3.31%	-14.73%	-12.91%	39.76%	-26.52%	-2.40%	-2.01%	-4.06%	-3.06%
General Aviation[1]	-4.35%	-13.58%	-3.02%	9.62%	4.39%	1.15%	-0.19%	-2.27%	-4.60%	-3.30%	-1.74%	-18.43%	-2.64%
Military & Other	1.76%	-4.67%	3.58%	9.03%	15.43%	0.44%	33.23%	85.25%	-17.57%	-2.72%	1.03%	-	1.03%
Total	-2.77%	-6.53%	-1.11%	5.45%	4.95%	-3.20%	-1.10%	1.90%	-10.12%	-3.27%	-1.70%	-5.10%	-2.73%
2001 Percent of Total	10.59%	9.52%	6.85%	7.19%	7.77%	5.14%	3.92%	3.34%	2.75%	13.19%	70.27%	29.73%	100.00%
2001 to 2002													
Commercial	-12.01%	-3.99%	1.10%	-3.92%	-17.63%	33.50%	-16.46%	-27.86%	12.80%	2.95%	-5.74%	-15.63%	-10.74%
General Aviation[1]	-8.66%	0.84%	-33.39%	-6.92%	-3.72%	1.37%	10.82%	14.99%	-6.02%	6.30%	0.05%	-10.94%	-0.44%
Military & Other	2.91%	-1.82%	-38.06%	-4.29%	2.93%	2.53%	35.70%	-54.42%	-0.01%	13.74%	1.06%	-	1.06%
Total	-10.85%	-2.48%	-13.47%	-5.59%	-8.50%	9.09%	8.96%	9.12%	-2.90%	6.24%	-2.14%	-15.34%	-6.07%
2002 Percent of Total	9.92%	4.22%	0.61%	3.53%	19.84%	44.51%	0.97%	0.68%	13.40%	2.32%	100.00%	0.00%	100.00%
2002 to 2003													
Commercial	-8.20%	-12.73%	9.36%	-7.06%	-1.63%	4.97%	-3.19%	-78.63%	-10.02%	-55.23%	-6.45%	-5.96%	-6.22%
General Aviation[1]	-2.60%	-5.71%	0.01%	-23.71%	-15.45%	2.79%	-12.77%	7.07%	-12.24%	-9.24%	-8.60%	11.97%	-7.77%
Military & Other	-30.75%	-3.52%	-13.83%	-32.98%	-5.76%	20.67%	30.86%	-9.57%	-6.08%	-19.80%	2.57%	-	2.57%
Total	-8.07%	-10.36%	6.27%	-16.67%	-9.53%	8.98%	-11.83%	0.81%	-10.75%	-10.70%	-7.16%	-4.79%	-6.52%
2003 Percent of Total	9.89%	9.48%	7.17%	6.44%	7.33%	6.96%	4.29%	4.18%	2.72%	14.25%	72.71%	27.29%	100.00%
2003 to 2004													
Commercial	4.72%	-0.95%	10.52%	8.95%	8.95%	-2.56%	21.48%	-100.00%	-12.54%	45.74%	4.95%	8.52%	6.66%
General Aviation[1]	19.01%	-18.66%	-7.15%	-5.65%	8.42%	-18.59%	8.59%	9.60%	4.41%	-8.12%	-2.58%	8.99%	-2.02%
Military & Other	-2.71%	-86.14%	131.17%	-7.66%	8.18%	-9.90%	30.15%	40.21%	1.00%	4.64%	-5.97%	-	-5.97%
Total	7.35%	-8.45%	5.60%	1.38%	8.59%	-11.27%	9.69%	8.14%	1.62%	-7.23%	0.04%	8.56%	2.37%
2004 Percent of Total	10.37%	8.48%	7.39%	6.38%	7.77%	6.04%	4.60%	4.42%	2.70%	12.91%	71.06%	28.94%	100.00%

Table F-2 Percentage Change in Aircraft Operations by Classification for New England's Airports, 2000 to 2007 (Continued)

Airport	Bradley International	T.F. Green	Manchester-Boston Regional	Portland International Jetport	Burlington	Bangor	Tweed-New Haven	Worcester Regional	Pease International Tradeport	Hanscom Field	Subtotal	Logan[2]	Total
2004 to 2005													
Commercial	9.40%	5.84%	1.30%	-8.20%	5.44%	4.03%	36.35%	-	-19.69%	-15.81%	4.69%	1.02%	2.90%
General Aviation[1]	3.32%	-19.32%	-3.90%	-12.89%	-8.81%	0.44%	3.42%	2.28%	-1.99%	-5.63%	-4.38%	0.00%	-4.14%
Military & Other	-9.73%	-30.35%	-36.05%	5.01%	-7.55%	-18.61%	5.25%	-2.08%	-1.64%	-24.35%	-12.75%	-	-12.75%
Total	7.51%	-1.66%	-0.34%	-10.19%	-3.21%	-5.19%	5.75%	6.65%	-3.78%	-6.00%	-1.29%	0.94%	-0.65%
2005 Percent of Total	11.22%	8.39%	7.42%	5.77%	7.57%	5.76%	4.89%	4.74%	2.61%	12.22%	70.60%	29.40%	100.00%
2005 to 2006													
Commercial	-6.47%	-8.02%	-11.81%	-9.37%	-6.01%	-9.66%	-15.64%	39.09%	24.52%	-15.72%	-7.92%	-0.84%	-4.53%
General Aviation[1]	3.62%	-9.34%	-4.91%	-1.71%	-10.86%	-0.56%	-15.09%	-9.52%	2.03%	1.29%	-4.13%	0.67%	-3.86%
Military & Other	17.48%	-4.98%	54.07%	9.32%	-18.91%	-7.43%	8.84%	17.34%	1.67%	58.52%	-4.07%	-	-4.07%
Total	-3.75%	-8.34%	-9.74%	-5.59%	-9.71%	-5.58%	-14.77%	-7.30%	3.93%	1.23%	-5.72%	-0.72%	-4.25%
2006 Percent of Total	11.28%	8.03%	6.99%	5.69%	7.14%	5.68%	4.36%	4.59%	2.83%	12.92%	69.51%	30.49%	100.00%
2006 to 2007													
Commercial	-3.81%	-0.93%	2.69%	7.21%	-3.42%	-3.81%	-11.26%	-16.64%	7.26%	13.74%	-0.85%	-1.01%	-0.93%
General Aviation[1]	-15.17%	-9.90%	-4.45%	-10.82%	6.86%	-14.43%	-0.97%	7.97%	4.00%	-3.92%	-3.12%	-8.94%	-3.46%
Military & Other	17.23%	5.68%	-12.74%	-9.90%	2.46%	-6.31%	-18.41%	44.33%	2.82%	0.35%	-0.77%	-	-0.77%
Total	**-5.81%**	**-3.06%**	**0.64%**	**-1.60%**	**1.96%**	**-8.74%**	**-2.24%**	**6.81%**	**4.10%**	**-3.57%**	**-2.06%**	**-1.62%**	**-1.93%**
2007 Percent of Total	**10.83%**	**7.94%**	**7.18%**	**5.71%**	**7.42%**	**5.29%**	**4.34%**	**5.00%**	**3.01%**	**12.70%**	**69.42%**	**30.58%**	**100.00%**

Source: Massport, Federal Aviation Administration (FAA) Tower Counts, and individual airport records.

Note: 2001 to 2002 General Aviation data for New Haven includes general aviation, military, and other operations.

1 Includes itinerant and local general aviation operations at the regional airports. There are no local (touch-and-go training) operations at Logan Airport.

2 Includes international operations.

Table F-3 Scheduled Passenger Operations by Market and Carrier for Bradley International Airport

		Departures						Seats					
Carrier	Market	2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
Jet Carriers													
America West	Phoenix	366	366	364	61	-303	-83.3%	51,960	54,627	54,558	7,517	-47,041	-86.2%
American	Chicago O'Hare	2,001	1,574	957		-957	-100.0%	265,113	204,054	123,444		-123,444	-100.0%
American	Dallas/Fort Worth	1,403	1,055	1,078	1,087	9	0.8%	180,987	137,038	143,630	153,940	10,310	7.2%
American	Miami	487	366	365	364	-1	-0.4%	71,102	50,059	52,558	51,527	-1,031	-2.0%
American	San Juan	366	366	364	364	0	-0.1%	92,171	54,594	81,473	70,683	-10,790	-13.2%
Continental	Cleveland	127	131	91	130	39	42.7%	15,985	16,182	9,803	16,108	6,305	64.3%
Continental	Houston Intercontinental	222	314	225	229	4	2.0%	25,341	34,139	26,361	26,162	-199	-0.8%
Continental	New York Newark				4	4	-				450	450	-
Delta Air Lines	Atlanta	2,558	3,133	2,399	2,152	-247	-10.3%	450,671	480,501	346,019	325,893	-20,126	-5.8%
Delta Air Lines	Cincinnati	1,438	1,378	766	559	-207	-27.1%	257,177	197,099	102,413	81,465	-20,948	-20.5%
Delta Air Lines	Salt Lake City		26	207		-207	-100.0%		3,915	31,176		-31,176	-100.0%
Delta Air Lines	Las Vegas			108		-108	-100.0%			16,238		-16,238	-100.0%
Delta Air Lines	Los Angeles			208	286	78	37.4%			31,890	42,867	10,977	34.4%
Delta Air Lines	Fort Lauderdale/Hollywood			472	667	195	41.3%			78,602	96,975	18,373	23.4%
Delta Air Lines	Orlando			524	823	299	57.0%			87,704	118,140	30,436	34.7%
Delta Air Lines	West Palm Beach			242	355	113	46.7%			38,130	50,938	12,808	33.6%
Delta Air Lines	Fort Myers			30	143	113	376.3%			4,304	20,290	15,986	371.4%
Delta Air Lines	Tampa			450	658	208	46.3%			72,060	93,459	21,399	29.7%
Frontier Airlines	Denver				303	303	-				40,009	40,009	-
Laker Airways (Bahamas) Limited	Freeport	26				0	-	3,900				0	-
Northwest	Amsterdam				182	182	-				29,098	29,098	-
Northwest	Detroit	1,504	1,456	1,394	1,368	-26	-1.8%	204,604	192,970	180,912	177,669	-3,243	-1.8%
Northwest	Minneapolis	1,098	1,046	1,057	1,057	0	0.0%	149,646	140,375	146,804	142,440	-4,364	-3.0%
Song	Fort Lauderdale/Hollywood	702	676	242		-242	-100.0%	139,613	134,176	48,254		-48,254	-100.0%
Song	Los Angeles		100	82		-82	-100.0%		19,910	16,372		-16,372	-100.0%
Song	Orlando	1,023	1,099	364		-364	-100.0%	203,634	218,144	72,380		-72,380	-100.0%
Song	Tampa	662	680	229		-229	-100.0%	131,795	135,041	45,669		-45,669	-100.0%
Song	West Palm Beach	537	519	121		-121	-100.0%	106,806	103,012	24,127		-24,127	-100.0%
Southwest	Baltimore	3,059	3,104	3,104	3,126	22	0.7%	419,083	424,316	424,877	427,904	3,027	0.7%
Southwest	Chicago Midway	710	954	1,031	1,057	26	2.5%	97,309	130,513	141,184	144,743	3,559	2.5%
Southwest	Las Vegas	375	366	364	364	0	-0.1%	51,336	50,060	49,830	49,830	0	0.0%

Table F-3 Scheduled Passenger Operations by Market and Carrier for Bradley International Airport (Continued)

		Departures						Seats					
Carrier	Market	2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
Southwest	Nashville	366	366	364	364	0	-0.1%	50,142	50,060	49,830	49,830	0	0.0%
Southwest	Orlando	833	1,112	1,104	1,087	-17	-1.6%	114,082	151,967	151,269	148,380	-2,889	-1.9%
Southwest	Philadelphia	296	1,595	1,074	173	-901	-83.9%	40,591	218,118	147,116	23,728	-123,388	-83.9%
Southwest	Tampa	383	698	727	727	0	0.1%	52,530	95,352	99,659	99,023	-636	-0.6%
United	Chicago O'Hare	2,065	1,818	1,810	1,793	-17	-1.0%	317,682	259,712	253,288	258,562	5,274	2.1%
United	Washington Dulles	492	728	940	1,108	168	17.9%	63,854	81,728	111,047	133,277	22,230	20.0%
US Airways	Charlotte	1,574	2,197	1,654	1,511	-143	-8.6%	229,826	351,454	227,078	218,427	-8,651	-3.8%
US Airways	Fort Lauderdale/Hollywood	9	126			0	-	1,272	15,503			0	-
US Airways	Orlando	48	31	30		-30	-100.0%	5,986	3,863	3,741		-3,741	-100.0%
US Airways	Philadelphia	1,913	2,110	927	442	-485	-52.4%	267,741	301,864	139,404	63,694	-75,710	-54.3%
US Airways	Phoenix				238	238	-				28,578	28,578	-
US Airways	Pittsburgh	1,198	26			0	-	157,633	3,132			0	-
US Airways	Washington National	1,081	1,068	944	1,087	143	15.1%	141,901	141,279	129,831	142,725	12,894	9.9%
USA 3000 Airlines	Cancun		26	30	22	-8	-27.8%		4,307	5,092	3,637	-1,455	-28.6%
USA 3000 Airlines	Punta Cana		13	22	17	-5	-21.3%		2,114	3,637	2,910	-727	-20.0%
Subtotal		**28,921**	**30,623**	**26,464**	**23,906**	**-2,558**	**-9.7%**	**4,361,471**	**4,461,178**	**3,771,764**	**3,340,876**	**-430,888**	**-11.4%**
Regional/Commuter Carriers													
Air Canada Jazz	Montreal Dorval	152				0	-	5,624				0	-
Air Canada Jazz	Toronto	610	719	966	961	-5	-0.5%	22,570	26,557	36,121	35,567	-554	-1.5%
Air Georgian (AC)	Montreal Dorval	885	1,042	1,018	1,039	21	2.1%	15,933	19,496	19,333	19,745	412	2.1%
Air Georgian (AC)	Toronto	728	628	312	312	0	-0.1%	13,096	11,732	5,923	5,923	0	0.0%
America West Express/Mesa	Charlotte				165	165	-				14,150	14,150	-
American Connection/Chautauqua	St. Louis				740	740	-				32,579	32,579	-
American Connection/Transtates	St. Louis	880	950	892	212	-680	-76.2%	32,571	44,361	44,599	10,609	-33,991	-76.2%
American Eagle	Chicago O'Hare	9		697	1,819	1,122	160.9%	416		33,921	80,018	46,097	135.9%
American Eagle	Raleigh/Durham	1,233	1,369	1,364	1,182	-182	-13.3%	46,535	54,597	52,133	44,586	-7,547	-14.5%
Continental Express	Cleveland	1,124	1,107	1,156	935	-221	-19.1%	56,179	55,075	57,806	46,708	-11,098	-19.2%
Continental Express	New York Newark	1,368	1,356	1,360	1,381	21	1.6%	68,285	67,529	67,981	66,474	-1,507	-2.2%
Continental Express/Chautauqua	Cleveland				212	212	-				10,609	10,609	-
Delta Connection/ASA	Atlanta			82		-82	-100.0%			5,789		-5,789	-100.0%
Delta Connection/ASA	Cincinnati				13	13	-				909	909	-

Table F-3 Scheduled Passenger Operations by Market and Carrier for Bradley International Airport (Continued)

		Departures						Seats					
Carrier	Market	2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
Delta Connection/Chautauqua	Columbus	93	998	541	593	52	9.7%	4,650	49,299	23,685	29,604	5,919	25.0%
Delta Connection/Chautauqua	Cincinnati			100	4	-96	-95.7%			4,980	217	-4,764	-95.7%
Delta Connection/Chautauqua	New York JFK			113		-113	-100.0%			4,165		-4,165	-100.0%
Delta Connection/Freedom	New York JFK			429	784	355	82.7%			15,861	28,998	13,137	82.8%
Delta Connection/Comair	Cincinnati				779	779	-				48,669	48,669	-
Delta Connection/Comair	New York JFK				390	390	-				19,485	19,485	-
Delta Connection/Comair	Columbus			78		-78	-100.0%			3,897		-3,897	-100.0%
Delta Connection/Comair	Orlando			87		-87	-100.0%			6,062		-6,062	-100.0%
Delta Connection/Comair	Fort Myers			359		-359	-100.0%			25,157		-25,157	-100.0%
Midwest Connect	Milwaukee	941		940	827	-113	-12.0%	30,117		30,068	35,272	5,204	17.3%
Northwest Airlink/Pinnacle	Indianaplolis	113	640	624	606	-18	-2.9%	5,664	31,973	31,176	30,310	-866	-2.8%
Northwest Airlink/Pinnacle	Minneapolis		31			0	-		1,522			0	-
Northwest Airlink/Pinnacle	Detroit			95	329	234	246.4%			4,763	16,454	11,691	245.5%
United Express	Chicago O'Hare	475	693	688	688	0	0.0%	24,456	48,416	48,106	47,258	-849	-1.8%
United Express	Washington Dulles	1,676	1,526	1,013	792	-221	-21.8%	84,513	84,651	63,218	48,955	-14,263	-22.6%
US Airways Express	Buffalo	889	841	827	810	-17	-2.1%	32,121	28,627	28,119	27,530	-589	-2.1%
US Airways Express	Charlotte			104	121	17	16.7%			6,686	10,167	3,481	52.1%
US Airways Express	Philadelphia	206	440	1,936	2,464	528	27.3%	9,500	27,675	119,257	176,785	57,528	48.2%
US Airways Express	Pittsburgh	183	1,652	1,628	1,576	-52	-3.2%	9,247	84,729	88,358	79,949	-8,409	-9.5%
US Airways Express	Rochester	575	576	567	611	43	7.6%	21,280	19,570	19,286	20,758	1,472	7.6%
US Airways Express	Syracuse	584	480			0	-	11,093	9,091			0	-
US Airways Express	Washington National	392	554	896	862	-34	-3.8%	19,813	34,513	58,884	51,181	-7,704	-13.1%
Subtotal		**13,116**	**15,602**	**18,872**	**21,208**	**2,336**	**12.4%**	**513,662**	**699,413**	**905,333**	**1,039,468**	**134,135**	**14.8%**
Total		**42,037**	**46,225**	**45,336**	**45,114**	**-222**	**-0.5%**	**4,875,134**	**5,160,591**	**4,677,097**	**4,380,345**	**-296,753**	**-6.3%**

Source: OAG Schedules.

Table F-4 Scheduled Passenger Operations by Market and Carrier for T.F. Green Airport

		Departures						Seats					
Carrier	Market	2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
Jet Carriers													
American	Dallas/Fort Worth	364	366	91		-91	-100.0%	46,920	47,137	11,730		-11,730	-100.0%
American	Chicago O'Hare	1,598	1,116	260		-260	-100.0%	206,112	143,654	33,514		-33,514	-100.0%
Continental	Cleveland	130	13			0	-	15,475	1,618			0	-
Continental	New York Newark	329	283		247	247	-	38,329	34,878		27,140	27,140	-
Delta Air Lines	Atlanta	1,819	1,984	827	255	-572	-69.1%	287,858	291,407	108,527	36,524	-72,004	-66.3%
Delta Air Lines	Cincinnati	727	698	238		-238	-100.0%	103,296	89,332	23,815		-23,815	-100.0%
L.B. Limited	Freeport	9				0	-	1,299				0	-
Northwest	Detroit	1,503	1,557	1,390	1,273	-117	-8.4%	202,644	202,545	191,057	162,531	-28,526	-14.9%
Northwest	Minneapolis	637	541	303	281	-22	-7.1%	85,344	68,974	41,949	34,900	-7,049	-16.8%
SATA	Ponta Delgada	17		17	13	-4	-23.6%	3,464		3,464	2,598	-866	-25.0%
Southwest	Baltimore	4,196	4,194	4,235	4,243	8	0.2%	574,431	573,304	580,159	579,181	-978	-0.2%
Southwest	Chicago Midway	1,083	1,352	1,368	1,394	26	1.9%	148,303	184,745	187,454	190,724	3,270	1.7%
Southwest	Fort Lauderdale/Hollywood	26			221	221	-	3,559			30,254	30,254	-
Southwest	Las Vegas	9	31	364	364	0	-0.1%	1,186	4,172	49,830	49,830	0	0.0%
Southwest	Philadelphia	1,186	1,779	1,910	1,979	69	3.6%	162,540	238,645	261,216	271,097	9,881	3.8%
Southwest	Kansas City	364	366	30		-30	-100.0%	49,830	50,060	4,152		-4,152	-100.0%
Southwest	Nashville	701	724	394	364	-30	-7.7%	96,100	98,928	53,982	49,830	-4,152	-7.7%
Southwest	Orlando	1,576	1,827	1,832	2,022	190	10.4%	215,928	249,703	250,928	277,029	26,101	10.4%
Southwest	Phoenix	727	728	727	637	-90	-12.4%	99,659	99,523	99,659	87,202	-12,457	-12.5%
Southwest	Tampa	1,078	1,090	1,087	1,091	4	0.4%	147,709	148,987	148,896	149,489	593	0.4%
Spirit Airlines	Detroit	61	122			0	-	9,093	18,270			0	-
Spirit Airlines	Fort Lauderdale/ Hollywood	130	571	398	152	-246	-61.9%	19,485	84,381	57,208	21,174	-36,034	-63.0%
Spirit Airlines	Fort Myers	69	366	182	186	4	2.3%	10,392	54,810	29,825	32,969	3,144	10.5%
United	Chicago O'Hare	1,546	1,465	1,485	1,485	0	0.0%	233,344	200,813	188,468	178,725	-9,743	-5.2%
US Airways	Charlotte	1,572	1,866	1,429	1,251	-178	-12.4%	221,913	274,911	223,415	180,448	-42,967	-19.2%
US Airways	Fort Lauderdale/ Hollywood	30	17			0	-	3,906	2,218			0	-
US Airways	Orlando	48	44	13	13	0	-0.1%	6,097	148,874		1,871	1,871	-
US Airways	Philadelphia	2,399	2,193	1,126	1,048	-78	-6.9%	342,966	313,648	148,874	134,901	-13,973	-9.4%
US Airways	Pittsburgh	1,282	31			0	-	173,477	4,367			0	-
US Airways	Washington National	1,100	1,273	1,329	758	-571	-43.0%	148,510	170,102	176,014	96,585	-79,429	-45.1%
Subtotal		**26,313**	**26,597**	**21,035**	**19,277**	**-1,758**	**-8.4%**	**3,659,170**	**3,800,006**	**2,874,136**	**2,594,999**	**-279,137**	**-9.7%**

Table F-4 Scheduled Passenger Operations by Market and Carrier for T.F. Green Airport (Continued)

		Departures						Seats					
Carrier	Market	2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
Regional/Commuter Carriers													
Air Georgian (AC)	Toronto	792	737	697	697	0	0.0%	14,263	13,794	13,245	13,245	0	0.0%
America West Express/Mesa	Charlotte				126	126	-				10,799	10,799	-
American Eagle	Raleigh/Durham	637	349			0	-	25,365	13,276			0	-
American Eagle	Chicago O'Hare			836	1,091	255	30.6%			36,822	48,219	11,397	31.0%
Cape Air	Hyannis			1,273		-1,273	-100.0%			11,457		-11,457	-100.0%
Cape Air	Martha's Vineyard	1,940	1,012	26	1,005	979	3766.7%	17,459	9,083	234	9,041	8,807	3766.7%
Cape Air	Nantucket	2,737	1,195	1,035	1,173	139	13.4%	24,629	10,727	9,314	10,561	1,247	13.4%
Continental Connection/CommutAir	Albany	697						13,245					
Continental Express	Cleveland	1,113	1,243	4	637	632	14600.0%	55,584	61,988	450	31,769	31,319	6954.8%
Continental Express	New York Newark	1,386	1,461	281	1,477	1,195	424.6%	67,254	71,279	29,271	71,969	42,698	145.9%
Continental Express/Chatauqua	Cleveland				684	684	-				34,207	34,207	-
Delta Connection/ASA	Atlanta		31	701	1,221	520	74.2%		1,522	37,065	67,115	30,050	81.1%
Delta Connection/ASA	Cincinnati		31	61	113	52	84.6%		1,522	3,031	7,188	4,157	137.1%
Delta Connection/Chautauqua	Cincinnati	212		13		-13	-100.0%	10,609		537		-537	-100.0%
Delta Connection/Chautauqua	New York JFK			225		-225	-100.0%			8,331		-8,331	-100.0%
Delta Connection/Comair	Atlanta				56	56	-				2,815	2,815	-
Delta Connection/Comair	Cincinnati	121	344	671	862	191	28.4%	6,062	17,618	39,663	45,855	6,192	15.6%
Delta Connection/Comair	New York JFK				329	329	-				16,454	16,454	-
Freedom	Atlanta				9	9	-				433	433	-
Freedom	New York JFK			312	905	593	190.1%			11,535	33,484	21,949	190.3%
Northwest Airlink/Pinnacle	Minneapolis	78	31			0	-	3,897	1,522			0	-
United Express	Washington Dulles	2,732	1,722	1,650	1,585	-65	-3.9%	136,612	85,912	84,825	89,995	5,170	6.1%
United Express	Chicago O'Hare	212	261	334	217	-118	-35.2%	10,609	18,270	23,339	14,843	-8,496	-36.4%
US Airways Express	Charlotte	13	17	338	364	26	7.7%	650	870	26,569	28,006	1,438	5.4%
US Airways Express	Washington National	143	484	624	1,251	628	100.7%	7,145	31,129	31,271	78,572	47,301	151.3%
US Airways Express	Pittsburgh	182	1,365	1,390	979	-411	-29.6%	9,093	72,862	76,641	51,311	-25,331	-33.1%
US Airways Express	New York La Guardia	1,797	1,674	1,810	1,849	39	2.2%	49,843	55,132	59,460	57,277	-2,182	-3.7%
US Airways Express	Philadelphia	22	715	1,680	1,728	48	2.8%	1,312	45,048	105,137	123,046	17,909	17.0%
Subtotal		**14,813**	**12,672**	**13,961**	**18,355**	**4,394**	**31.5%**	**453,628**	**511,554**	**608,197**	**846,204**	**238,007**	**39.1%**
Total		**41,126**	**39,269**	**34,995**	**37,632**	**2,637**	**7.5%**	**4,112,799**	**4,311,560**	**3,482,333**	**3,441,203**	**-41,130**	**-1.2%**

Source: OAG Schedules.

Table F-5 Scheduled Passenger Operations by Market and Carrier for Manchester-Boston Regional Airport

		Departures						Seats					
Carrier	Market	2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
Jet Carriers													
Continental	New York Newark	314	288	260	4	-256	-98.3%	36,123	31,076	27,019	450	-26,569	-98.3%
Delta Air Lines	Atlanta	732	671			0	-	103,944	95,126			0	-
Delta Air Lines	Cincinnati	710	667			0	-	100,840	86,834			0	-
Northwest	Detroit	1,460	1,404	1,295	1,195	-100	-7.7%	202,623	181,073	180,284	148,805	-31,479	-17.5%
Northwest	Minneapolis	362	366	238	152	-87	-36.4%	44,835	46,980	30,258	18,792	-11,466	-37.9%
Pan American Airways	Myrtle Beach	83				0	-	12,429				0	-
Pan American Airways	Portsmouth	183				0	-	27,471				0	-
Pan American Airways	Sanford	87				0	-	13,114				0	-
Southwest	Baltimore	3,874	3,863	3,845	3,884	39	1.0%	530,588	527,946	523,458	528,637	5,179	1.0%
Southwest	Chicago Midway	693	1,360		1,624	1,624	-	94,744	185,741		221,908	221,908	-
Southwest	Fort Lauderdale/Hollywood	9				0	-	1,194				0	-
Southwest	Kansas City	305				0	-	41,785				0	-
Southwest	Las Vegas	375	366	364	364	0	-0.1%	51,336	50,060	49,830	49,830	0	0.0%
Southwest	Nashville	715	732	61		-61	-100.0%	97,896	99,989	8,305		-8,305	-100.0%
Southwest	Orlando	1,129	1,474	1,451	1,767	316	21.8%	154,673	201,431	198,725	241,965	43,240	21.8%
Southwest	Philadelphia	788	1,792	1,749	1,996	247	14.1%	107,995	244,609	239,657	273,097	33,440	14.0%
Southwest	Phoenix				121		-				16,610		
Southwest	Tampa	845	1,103	1,091	1,026	-65	-5.9%	115,693	150,319	149,489	140,591	-8,898	-6.0%
United	Chicago O'Hare	1,464	1,343	1,091	1,061	-30	-2.8%	209,179	179,246	137,460	128,359	-9,102	-6.6%
US Airways	Charlotte	1,276	1,312	658	606	-52	-7.9%	167,699	179,003	90,887	83,630	-7,257	-8.0%
US Airways	Philadelphia	1,806	2,032	680	329	-351	-51.6%	244,129	275,085	94,901	45,517	-49,384	-52.0%
US Airways	Pittsburgh	553				0	-	77,259				0	-
US Airways	Washington National	113	576	537	303	-234	-43.5%	14,323	77,334	77,316	43,568	-33,748	-43.6%
Subtotal		17,876	19,349	13,320	14,432	1,112	8.3%	2,449,873	2,611,852	1,807,589	1,941,758	134,169	7.4%
Regional/Commuter Carriers													
Air Canada Jazz	Toronto	17				0	-	634				0	-
Air Georgian (AC)	Toronto	1,007	933	905	914	9	1.0%	18,123	17,461	17,194	17,359	165	1.0%
America West Express/Mesa	Charlotte				260	260	-				22,343	22,343	-
Compass Airlines	Minneapolis				61	61	-				4,728	4,728	-
Continental Connection/CommutAi	Albany	1,007	314			0	-	19,130	5,951			0	-

Table F-5 Scheduled Passenger Operations by Market and Carrier for Manchester-Boston Regional Airport (Continued)

		Departures						Seats					
Carrier	Market	2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
Continental Express	Cleveland	1,198	1,190	1,208	1,230	22	1.8%	59,729	59,095	60,009	60,079	70	0.1%
Continental Express	New York Newark	1,150	1,168	1,191	1,446	255	21.4%	57,169	58,177	59,538	71,804	12,266	20.6%
Delta Connection/ASA	Atlanta	122	484	1,433	1,083	-351	-24.5%	6,100	26,492	94,091	75,775	-18,316	-19.5%
Delta Connection/ASA	Cincinnati		275		48	48	-		13,702		3,334	3,334	-
Delta Connection/Comair	Atlanta	244		182	91	-91	-50.0%	12,200		12,730	6,365	-6,365	-50.0%
Delta Connection/Comair	Cincinnati	750	462	983	931	-52	-5.3%	39,299	24,708	54,515	52,003	-2,512	-4.6%
Delta Connection/Comair	New York La Guardia	1,067	488			0	-	53,350	24,360			0	-
Delta Connection/Comair	New York JFK				61	61	-				3,031	3,031	-
Freedom	New York JFK			450	996	546	121.3%			16,662	38,650	21,988	132.0%
Northwest Airlink/Mesaba	Detroit				22	22	-				1,645	1,645	-
Northwest Airlink/Pinnacle	Detroit	13		91	26	-65	-71.5%	664		4,547	1,299	-3,248	-71.4%
Northwest Airlink/Pinnacle	Minneapolis	324	235	91	91	0	-0.1%	16,179	11,745	4,547	4,547	-1	0.0%
Pan Am Clipper Connection	Bangor	4				0	-	80				0	-
Pan Am Clipper Connection	New London/Groton	22				0	-	399				0	-
Pan Am Clipper Connection	Portsmouth	4				0	-	80				0	-
United Express/Air Wisconsin	Chicago O'Hare	183				0	-	9,150				0	-
United Express/Air Wisconsin	Washington Dulles	672				0	-	33,600				0	-
United Express/Atlantic Coast	Chicago O'Hare	30				0	-	1,500				0	-
United Express/Atlantic Coast	Washington Dulles	486				0	-	24,300				0	-
United Express/Chautauqua	Washington Dulles	244	610	30		-30	-100.0%	12,200	30,450	1,516		-1,516	-100.0%
United Express/GoJet	Chicago O'Hare		31	242		-242	-100.0%		2,132	16,974		-16,974	-100.0%
United Express/Mesa	Washington Dulles		244	1,225	1,074	-151	-12.3%		14,616	61,356	58,057	-3,299	-5.4%
United Express/Mesa	Chicago O'Hare			91	364	273	299.7%			6,365	24,975	18,610	292.4%
United Express/Transtates	Washington Dulles	276	911	56	351	295	526.3%	13,800	45,457	2,815	17,537	14,722	523.0%
US Airways Express	Charlotte				169	169	-				12,453	12,453	-
US Airways Express	New York La Guardia	2,632	2,507	2,446	2,446	0	0.0%	90,511	86,552	83,790	83,010	-779	-0.9%
US Airways Express	Philadelphia	370	562	2,113	2,018	-95	-4.5%	19,654	30,202	115,559	134,767	19,208	16.6%
US Airways Express	Pittsburgh	567	1,024			0	-	28,935	51,113			0	-
US Airways Express	Washington National	976	510	546	779	234	42.9%	48,684	25,448	35,186	55,259	20,074	57.1%
Subtotal		13,365	11,948	13,283	14,458	1,175	8.8%	565,468	527,661	647,393	749,021	101,627	15.7%
Total		31,241	31,297	26,603	28,890	2,287	8.6%	3,015,341	3,139,513	2,454,982	2,690,779	235,797	9.6%

Table F-6 Scheduled Passenger Operations by Market and Carrier for Portland International Jetport

		Departures						Seats					
Carrier	Market	2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
Jet Carriers													
AirTran	Baltimore				585	585	-				68,392	68,392	-
AirTran	Orlando				91	91	-				10,639	10,639	-
Delta Air Lines	Atlanta	732	488			0	-	103,944	61,387			0	-
Delta Air Lines	Cincinnati	732	488	91		-91	-100.0%	103,944	69,182	9,093		-9,093	-100.0%
JetBlue	New York JFK			849	1,498	649	76.5%			118,815	181,340	62,525	52.6%
Northwest	Detroit	368	427	610	303	-307	-50.3%	36,800	42,630	61,053	30,310	-30,743	-50.4%
US Airways	Washington National	62	52			0	-	7,936	6,656			0	-
US Airways	Philadelphia	294	152			0	-	37,687	19,183			0	-
Subtotal		2,188	1,607	1,550	2,477	927	59.8%	290,311	199,038	188,961	290,682	101,721	53.8%
Regional/Commuter Carriers													
America West Express/Mesa	Charlotte				251	251	-				21,598	21,598	-
Continental Connection/CommutAir	Albany	1,268	296			0	-	24,097	5,620			0	-
Continental Connection/CommutAir	Boston		74			0	-		1,405			0	-
Continental Express	Cleveland	135	222	208	234	26	12.4%	6,757	10,979	10,392	11,072	680	6.5%
Continental Express	New York Newark	1,425	1,400	1,416	1,433	17	1.2%	70,061	69,704	70,796	71,662	866	1.2%
Delta Connection/ASA	Atlanta				1,052	1,052	-				73,653	73,653	-
Delta Connection/Atlantic Coast Jet	Atlanta		702	1,364		-1,364	-100.0%		48,416	95,477		-95,477	-100.0%
Delta Connection/Atlantic Coast Jet	Boston	182				0	-	5,824				0	-
Delta Connection/Atlantic Coast Jet	Cincinnati		31	940		-940	-100.0%		1,522	49,752		-49,752	-100.0%
Delta Connection/Chautauqua	Cincinnati				416	416	-				17,970	17,970	-
Delta Connection/Comair	Boston	1,282	1,160			0	-	64,100	57,855			0	-
Delta Connection/Comair	Cincinnati	184	571		589	589	-	9,200	29,624		29,444	29,444	-
Delta Connection/Comair	New York JFK				385	385	-				19,269	19,269	-
Delta Connection/Comair	New York La Guardia	1,098	1,099	996	585	-411	-41.3%	54,900	54,810	49,795	29,228	-20,568	-41.3%
Freedom	Cincinnati				4	4	-				217	217	-
Freedom	New York JFK			443	1,000	557	125.8%			16,021	45,396	29,375	183.4%
Northwest Airlink/Mesaba	Detroit	336	388	30	52	22	73.2%	23,184	26,713	2,091	3,949	1,858	88.9%
Northwest Airlink/Pinnacle	Detroit	691	532	294	533	239	81.2%	34,564	26,535	14,722	26,630	11,908	80.9%
Northwest Airlink/Pinnacle	Minneapolis	441	405	91	121	30	33.3%	22,057	20,227	4,547	6,062	1,516	33.3%
United Express	Chicago O'Hare	1,464	1,099	1,247	1,260	13	1.0%	73,200	67,599	87,293	84,998	-2,295	-2.6%
United Express	Washington Dulles	1,342	1,461	1,403	1,108	-294	-21.0%	67,100	83,738	92,575	70,683	-21,892	-23.6%
US Airways Express	Charlotte	193	366	429	113	-316	-73.7%	9,643	23,751	30,821	9,682	-21,139	-68.6%

Table F-6 Scheduled Passenger Operations by Market and Carrier for Portland International Jetport (Continued)

		Departures						Seats					
Carrier	Market	2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
US Airways Express	New York La Guardia	1,364	1,670	1,836	1,762	-74	-4.0%	45,007	77,987	89,432	84,063	-5,369	-6.0%
US Airways Express	Philadelphia	1,222	1,923	2,139	2,035	-104	-4.9%	68,684	100,607	112,571	120,911	8,340	7.4%
US Airways Express	Pittsburgh	799	218			0	-	43,103	10,874			0	-
US Airways Express	Presque Isle	130				0	-	2,470				0	-
US Airways Express	Washington National	984	1,151	1,169	1,373	204	17.4%	49,207	75,603	77,316	85,492	8,175	10.6%
Subtotal		14,540	14,768	14,004	14,306	302	2.2%	673,159	793,569	803,600	811,975	8,374	1.0%
Total		16,729	16,375	15,554	16,783	1,229	7.9%	963,470	992,607	992,561	1,102,656	110,095	11.1%

Source: OAG Schedules.

Table F-7 Scheduled Passenger Operations by Market and Carrier for Burlington Airport

Carrier	Market	Departures						Seats					
		2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
Jet Carriers													
JetBlue	New York J F Kennedy	1,094	1,129	1,455	1,490	35	2.4%	171,129	174,052	220,899	231,395	10,496	4.8%
United	Chicago O'Hare	401	366	424	650	226	53.2%	51,286	42,404	54,558	78,988	24,430	44.8%
Continental	New York Newark	4				0	-	531				0	-
Northwest	Detroit	214	174			0	-	21,400	17,400			0	-
US Airways	Philadelphia	366	366	364	182	-182	-50.0%	46,848	46,223	43,932	21,823	-22,109	-50.3%
US Airways	Washington National		4			0	-		548			0	-
Subtotal		2,079	2,039	2,243	2,321	78	3.5%	291,194	280,627	319,389	332,206	12,817	4.0%
Regional/Commuter Carriers													
Big Sky Airlines	Boston				242	242	-				4,607	4,607	-
Continental Express	Cleveland	493	510	537	611	74	13.7%	24,145	25,334	26,846	28,331	1,485	5.5%
Continental Express	New York Newark	1,407	1,461	1,442	1,446	4	0.3%	70,028	72,806	72,095	71,129	-966	-1.3%
Continental Express	Westchester County	17				0	-	331				0	-
Continental Express/CommutAir	Albany	541				0	-	10,284				0	-
Continental Express/CommutAir	Boston		632	979	208	-771	-78.8%		11,984	18,593	3,949	-14,644	-78.8%
Continental Express/CommutAir	Plattsburgh	423	366	580	178	-402	-69.3%	8,037	6,942	11,024	3,373	-7,651	-69.4%
Continental Express/CommutAir	Plattsburgh AFB				30	30	-				576		
Delta Connection	Atlanta		61	697		-697	-100.0%		3,044	34,857		-34,857	-100.0%
Delta Connection	Boston	1,098				0	-	45,072				0	-
Delta Connection/ASA	Atlanta				585	585	-				31,999		
Delta Connection/Comair	Atlanta				30	30	-				1,516		
Delta Connection/Comair	Boston		1,007			0	-		50,242			0	-
Delta Connection/Comair	Cincinnati	1,098	1,064	650	364	-286	-44.0%	54,900	53,070	31,479	18,186	-13,293	-42.2%
Delta Connection/Comair	New York JFK			199	693	494	248.1%			9,959	34,640	24,681	247.8%
Delta Connection/Freedom	New York JFK			377	667	290	76.9%			13,938	27,993	14,055	100.8%
Northwest Airlink/Mesaba	Detroit	184	214	481		-481	-100.0%	12,696	14,707	33,163		-33,163	-100.0%
Northwest Airlink/Pinnacle	Detroit	989	950	602	862	260	43.1%	49,429	47,415	30,094	43,084	12,990	43.2%
Northwest Airlink/Pinnacle	Minneapolis	13	61	61	91	30	49.1%	657	3,044	3,031	4,547	1,516	50.0%
United Express	Chicago O'Hare	966	1,007	961	727	-234	-24.3%	48,314	59,987	67,288	49,120	-18,168	-27.0%
United Express	Washington Dulles	1,464	1,461	1,451	1,399	-52	-3.6%	73,200	72,862	72,528	71,662	-867	-1.2%
US Airways Express	Charlotte			4		-4	-100.0%			217		-217	-100.0%

Table F-7 Scheduled Passenger Operations by Market and Carrier for Burlington Airport (Continued)

Carrier	Market	Departures						Seats					
		2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
US Airways Express	New York La Guardia	2,200	2,184	2,373	2,269	-104	-4.4%	81,400	80,636	87,795	83,950	-3,845	-4.4%
US Airways Express	Philadelphia	1,224	1,988	1,680	1,741	61	3.6%	60,830	97,453	87,808	95,373	7,565	8.6%
US Airways Express	Pittsburgh	675				0	-	33,771				0	-
US Airways Express	Washington National	1,024	994	996	1,091	95	9.6%	51,200	61,457	57,970	69,973	12,003	20.7%
Subtotal		13,818	13,960	14,070	13,233	-837	-5.9%	624,294	660,983	658,685	644,005	-14,679	-2.2%
Total		15,897	15,999	16,313	15,554	-759	-4.7%	915,488	941,610	978,074	976,211	-1,862	-0.2%

Source: OAG Schedules.

Table F-8 Scheduled Passenger Operations by Market and Carrier for Bangor Airport

Carrier	Market	Departures						Seats					
		2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
Jet Carriers													
Allegiant Air	Sanford				17	17	-				2,598	2,598	-
Subtotal		0	0	0	17	17	-	0	0	0	2,598	2,598	-
Regional/Commuter Carriers													
American Eagle	Boston	1,722	1,535	1,485	1,044	-441	-29.7%	64,063	56,654	55,983	38,611	-17,372	-31.0%
American Eagle	New York La Guardia	428	519	407	338	-69	-17.0%	15,836	19,153	15,060	12,496	-2,564	-17.0%
Big Sky Airlines	Boston				1,143	1,143					21,719	21,719	
Continental Connection/CommutAir	Albany	575	192			0	-	10,928	3,637			0	-
Continental Connection/CommutAir	New York Newark		480	559		-559	-100.0%		22,568	23,707		-23,707	-100.0%
Continental Express	New York Newark				437	437					17,420	17,420	
Delta Connection/ASA	Atlanta			212	507	295	139.0%			14,852	35,463	20,611	138.8%
Delta Connection/Atlantic Coast Jet	Boston	737				0	-	23,575				0	-
Delta Connection/Comair	Boston	736	1,421	1,035	251	-784	-75.7%	36,800	70,905	51,180	12,557	-38,623	-75.5%
Delta Connection/Comair	Cincinnati	1,464	1,400	675	693	17	2.6%	87,840	82,607	35,160	34,640	-520	
Northwest Airlink/Pinnacle	Detroit	968	1,016	818	818	0	0.0%	54,207	55,306	42,646	40,919	-1,728	-4.1%
Northwest Airlink/Pinnacle	Minneapolis	13	61	13	13	0	-0.1%	657	3,045	650	650	-1	-0.1%
Pan Am/Boston and Maine	Halifax	4				0	-	80				0	
Pan Am/Boston and Maine	Manchester	22				0	-	399				0	
US Airways Express	New York La Guardia	92	160		126	126	-	4,600	7,830		6,279	6,279	-
US Airways Express	Philadelphia	1,072	1,182	1,121	1,074	-47	-4.2%	53,593	58,943	56,076	60,594	4,518	8.1%
Subtotal		7,833	7,966	6,325	6,443	118	1.9%	352,577	380,648	295,314	281,347	-13,967	-4.7%
Total		7,833	7,966	6,325	6,461	135	2.1%	352,577	380,648	295,314	283,945	-11,369	-3.8%

Source: OAG Schedules.

Table F-9 Scheduled Passenger Operations by Market and Carrier for Tweed-New Haven Airport

Carrier	Market	Departures						Seats					
		2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
Regional/Commuter Carriers													
Pan Am Clipper Connection	Baltimore				277	277	-				4,988	4,988	-
Pan Am Clipper Connection	Bedford				113	113	-				2,026	2,026	-
Pan Am Clipper Connection	Elmira/Corning				152	152	-				2,728	2,728	-
Pan Am Clipper Connection	Portsmouth				56	56	-				1,013	1,013	-
Delta Connection/Comair	Cincinnati	642	1,029			0	-	32,100	51,330			0	-
US Airways Express	Philadelphia	1,372	1,910	2,071	1,697	-374	-18.0%	50,780	76,255	77,477	62,971	-14,506	-18.7%
Total		2,014	2,939	2,071	2,295	224	10.8%	82,880	127,585	77,477	73,727	-3,750	-4.8%

Source: OAG Schedules.

Table F-10 Scheduled Passenger Operations by Market and Carrier for Worcester Regional Airport

Carrier	Market	Departures						Seats					
		2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
Regional/Commuter Carriers													
Allegiant Air	Orlando/Sanford			181	17	-164	-90.6%			27,279	2,598	-24,681	-90.5%
US Airways Express	Philadelphia		4			0	-		596			0	-
Total		0	4	181	17	-164	-90.6%	0	596	27,279	2,598	-24,681	-90.5%

Source: OAG Schedules.

Table F-11 Scheduled Passenger Operations by Market and Carrier for Hanscom Field

Carrier	Market	Departures						Seats					
		2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
Regional/Commuter Carriers													
Pan Am Clipper Connection	Elmira/Coming	61	9		390	390	-	1,101	157		7,015	7,015	-
Pan Am Clipper Connection	New Haven	336	192	251	113	-138	-55.0%	6,051	3,445	4,520	2,026	-2,494	-55.2%
Pan Am Clipper Connection	New London/Groton	61	9			0	-	1,101	157			0	-
Pan Am Clipper Connection	Portsmouth	336	192	251	221	-30	-12.0%	6,051	3,445	4,520	3,975	-545	-12.1%
Pan Am Clipper Connection	Trenton	987		982	1,048	66	6.7%	17,763		17,692	18,861	1,169	6.6%
Shuttle America	Trenton	777	863			0	-	25,627	15,503			0	-
Total		2,558	1,265	1,484	1,772	288	19.4%	57,694	22,707	26,732	31,877	5,145	19.2%

Source: OAG Schedules.

Table F-12 Scheduled Passenger Operations by Market and Carrier for Pease International Tradeport

Carrier	Market	Departures						Seats					
		2004	2005	2006	2007	Change	Percent Change	2004	2005	2006	2007	Change	Percent Change
Jet Carriers													
Alliegiant Airways	Orlando/Sanford		35	191	34	-157	-82.2%		5,220	28,578	5,100	-23,478	-82.2%
Pan American Airways	Manchester	170				0	-	25,543				0	-
Pan American Airways	Sanford	261				0	-	39,107				0	-
Skybus	Columbus				409	409	-				58,896	58,896	-
Skybus	Punta Gorda				15	15	-				2,160	2,160	-
Skybus	Saint Augustine				14	14	-				2,016	2,016	-
Subtotal		431	35	191	472	281	147.1%	64,650	5,220	28,578	68,172	39,594	138.5%
Regional/Commuter Carriers													
Pan Am Clipper Connection	Bedford	420	170	221	196	-25	-11.3%	7,552	3,053	3,975	3,724	-251	-6.3%
Pan Am Clipper Connection	Fort Lauderdale/Hollywood	9	13			0	-	1,329	1,957			0	-
Pan Am Clipper Connection	Hartford		13			0			1,957			0	
Pan Am Clipper Connection	Manchester	4				0	-	80				0	-
Pan Am Clipper Connection	Martha's Vineyard	22				0	-	399				0	-
Pan Am Clipper Connection	Nantucket	82				0		1,476				0	
Pan Am Clipper Connection	Newburgh		48			0	-		7,178			0	-
Pan Am Clipper Connection	New Haven				8	8	-		7,178		152	152	-
Pan Am Clipper Connection	New London/Groton	217				0	-	3,901				0	-
Pan Am Clipper Connection	Saint John, Canada	173				0	-	3,111				0	-
Pan Am Clipper Connection	Sanford	57	57			0		8,507	8,483			0	
Pan Am Clipper Connection	Trenton		22		1	1	-		391		19	19	-
Pan Am Clipper Connection	Westchester County	43				0	-	782				0	-
Subtotal		1,027	323	221	205	-16	-7.2%	27,136	30,197	3,975	3,895	-80	-2.0%
Total		1,458	358	412	677	265	64.3%	91,786	35,417	32,553	72,067	39,514	121.4%

Source: OAG Schedules; U.S. DOT, T100 Database.
Note: Skybus did not report to the OAG, so all 2007 statistics for Pease International Tradeport are from the T100 Database.

G

Ground Transportation

This appendix provides information in support of *Chapter 5, Ground Transportation*:

- Table G-1 Logan Express Bus Service Ridership
- Table G-2 Water Transportation Services Ridership
- Table G-3 Massachusetts Bay Transportation Authority (MBTA) Airport Station Passengers
- Table G-4 Logan Airport Employee Parking Supply (September 2007)
- Table G-5 Logan Airport Commercial Parking Supply (September 2007)
- Table G-6 2007 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment, and Vehicle Miles Traveled (VMT) Summary
- 2007 Traffic Roadway Network

Table G-1 Logan Express Bus Service Ridership

	Ridership			Percent Change		
Service Year	Air Passengers	Employees	Total	Air Passengers	Employees	Total
Framingham						
1992	207,847	7,573	215,420	4.3%	21.3%	4.8%
1993	229,064	12,307	241,371	10.2%	62.5%	12.0%
1994	250,342	17,352	267,694	9.3%	41.0%	10.9%
1995	274,754	21,129	295,883	9.8%	21.8%	10.5%
1996	325,665	22,932	348,597	18.5%	8.5%	17.8%
1997	316,306	29,871	346,175	(2.9)%	30.3%	(0.7)%
1999	345,715	31,946	380,661	3.5%	(6.0)%	2.6%
2000	371,560	34,508	406,068	6.6%	8.0%	6.7%
2001	354,521	38,740	393,261	(4.6)%	12.3%	(3.2)%
2002	342,746	42,441	385,187	(3.3)%	8.7%	(2.1)%
2003	310,024	55,979	366,003	(9.5)%	31.9%	(5.0)%
2004	323,931	54,763	378,694	4.5%	(2.2%)	3.5%
2005	318,125	57,569	375,694	(1.8%)	5.1%	(0.8%)
2006	349,022	60,764	409,789	9.7%	5.5%	9.1%
2007	311,299	57,252	368,551	(2.1%)[4]	(0.6%)[4]	(1.9%)[4]
Braintree[1]						
1992	186,217	9,694	195,911	10.6%	16.6%	10.8%
1993	205,209	22,768	227,977	10.2%	134.9%	16.4%
1994	247,636	37,489	285,125	20.7%	64.7%	25.1%
1995	264,579	70,723	335,302	6.8%	88.7%	17.6%
1996	335,232	103,519	438,751	26.7%	46.4%	30.1%
1997	300,006	135,340	435,346	(10.5)%	30.7%	(0.8)%
1999	328,818	125,286	454,105	9.6%	(19.7)%	(0.5)%
2000	355,932	149,687	505,619	8.2%	19.5%	11.3%
2001	345,249	156,240	501,489	(3.0)%	4.4%	(0.8)%
2002	323,115	190,360	513,475	(6.4)%	21.8%	2.4%
2003	301,013	216,765	517,778	(6.8)%	13.9%	0.8%
2004	318,100	208,566	526,666	5.7%	(3.8%)	1.7%
2005	307,659	189,531	497,190	(3.2%)	(9.1%)	(5.5%)
2006	333,413	202,983	536,396	8.4%	7.1%	7.9%
2007	300,715	196,955	497,670	(2.3%)[4]	3.9%[4]	0.1%[4]
Woburn						
1992[2]	3,052	91	3,143	NA	NA	-
1993	59,635	5,027	64,662	NA	NA	-
1994	119,567	9,082	128,649	100.5%	80.7%	99.0%
1995	150,147	13,376	163,523	25.6%	47.3%	27.1%
1996	190,566	17,322	207,888	26.9%	29.5%	27.1%
1997	199,715	20,018	219,733	4.8%	15.6%	5.7%
1998	208,286	22,876	231,162	4.3%	14.3%	5.2%
1999	191,454	23,495	514,949	(8.1)%	2.7%	(7.0)%
2000	195,744	27,522	223,266	2.2%	17.1%	3.9%
2001	177,375	38,318	215,530	(9.4)%	39.2%	(3.4)%
2002	161,145	73,277	234,422	(9.2)%	91.0%	8.7%
2003	164,980	103,963	268,943	(2.4)%	41.9%	14.7%
2004	172,110	111,326	283,436	4.3%	7.1%	5.4%
2005	163,227	110,961	274,188	(5.1%)	(0.3%)	(3.2%)
2006	167,341	121,672	289,013	2.5%	9.7%	5.4%
2007	149,149	123,066	272,215	(8.6%)[4]	10.9%[4]	(0.7%)[4]

Table G-1 Logan Express Bus Service Ridership (Continued)

Service Year	Ridership			Percent Change		
	Air Passengers	Employees	Total	Air Passengers	Employees	Total
Peabody						
2001[3]	8,151	3,097	11,248	NA	NA	NA
2002	28,626	20,629	49,255	NA	NA	NA
2003	32,318	23,425	55,743	21.4%	13.6%	13.2%
2004	43,389	33,642	77,031	34.3%	43.6%	38.2%
2005	51,023	39,599	87,622	17.6%	17.7%	13.7%
2006	42,142	32,632	74,774	(17.4%)	(17.6%)	(14.7%)
2007	36,367	26,949	63,316	(28.7%)[4]	(31.9%)[4]	(27.7%)[4]
Total System Ridership						
1992	397,116	17,358	414,474	8.0%	19.2%	8.5%
1993	493,908	39,832	533,740	24.4%	129.5%	28.8%
1994	617,545	63,923	681,468	25.0%	60.5%	27.7%
1995	689,480	105,228	794,708	11.6%	64.6%	16.6%
1996	851,463	143,773	995,236	23.4%	36.6%	25.2%
1997	816,015	185,229	1,001,254	(4.2)%	28.8%	0.6%
1998	845,598	212,952	1,058,550	3.6%	15.0%	5.7%
1999	868,987	180,727	1,049,714	2.7%	(15.2)%	(0.8)%
2000	923,236	211,717	1,134,953	6.2%	17.1%	8.1%
2001	885,296	236,395	1,121,691	(4.1)%	11.7%	(1.2)%
2002	855,632	326,707	1,182,339	(3.4)%	38.2%	5.4%
2003	808,335	400,132	1,208,467	(5.5%)	22.5%	2.2%
2004	857,530	408,297	1,265,827	6.1%	2.0%	2.2%
2005	837,034	397,660	1,234,694	(2.4%)	(2.6%)	(2.4%)
2006	891,918	418,051	1,309,969	6.6%	5.1%	6.1%
2007	797,530	404,222	1,201,752	(4.7%)[4]	1.7%[4]	(2.7%)[4]

NA Not available.
1 Service originally based from the Quincy-Adams Massachusetts Bay Transportation Authority (MBTA) Station.
2 Reflects a partial year of operation; Woburn Logan Express service was implemented in November 1992.
3 The Peabody Logan Express service commenced in September 2001.
4 Percent comparison between 2007 and 2005.

Table G-2 Water Transportation Services Ridership[1]

	Rowes Wharf/Fan Pier Water Shuttle	Private Water Taxi (on-demand)[3]	Harbor Express (Long Wharf/Quincy/Hull)	Boston-Logan Water Shuttle (Long Wharf)	Total
1990	181,530	NS	NS	NS	181,530
1991	142,500	NS	NS	NS	142,500
1992	133,297	NS	NS	NS	133,297
1993	159,525	NS	NS	NS	159,525
1994	209,057	NS	NS	NS	209,057
1995	203,829	NS	NS	NS	203,829
1996	159,992	3,364	1,1781	NS	175,137
1997	132,542	6,299	7,1309	NS	210,150
1998	124,836	9,243	10,1174	NS	235,253
1999	122,211	17,252	98,539	NS	238,002
2000	128,097	26,335	83,243	NS	237,675
2001	107,400	29,642	82,704	NS	219,746
2002	75,304	36,736	85,652	NS	197,692
2003	19,853[2]	33,194[4]	61,849	5,762[5]	120,658
2004	9,467	45,073	57,953	3,202[6]	112,493
2005	NA	NA	NS	NS	50,000
2006	9,038	53,888	51,474	713	115,113
2007	10,304	37,561	51,474	1,669	101,008

Source: Massport, Port Planning and Development.
1 To and from Logan Airport.
2 Rowes Wharf Water Shuttle operated from January to June only in 2003.
3 Operates April-October only.
4 Operated from May to October only in 2003.
5 Long Wharf Boston-Logan Water Shuttle operated from August to December in 2003.
6 Joint operation with City Water Taxi began on August 16, 2003.
NA Not available.
NS Not in service.

Table G-3 Massachusetts Bay Transportation Authority (MBTA) Airport Station Passengers

Year	Turnstile Count[1]	Percent Change
1990	2,854,317	-
1991	2,515,293	(11.9)%
1992	2,626,572	4.2%
1993	2,604,980	(0.8)%
1994	3,108,734	19.3%
1995	3,040,868	(2.2)%
1996	2,974,850	(2.2)%
1997[2]	2,774,268	(6.7)%
1998	2,850,367	2.7%
1999	2,974,045	4.3%
2000	3,019,086	1.5%
2001	2,896,638	(4.1)%
2002	2,670,594	(7.8)%
2003[3]	2,575,899	(3.6)%
2004	2,740,372	6.4%
2005	NA	NA
2006	NA	NA
2007	2,524,079	--

Source: MBTA.
Note: Turnstile counts include both Logan Airport bound and non-Logan Airport bound passengers.
1 As stated in the *Logan Airport 1999 ESPR*, Massport believes that these ridership estimates are actually understated because many travelers that are destined for the Airport with baggage have been observed to avoid the turnstiles and exit Airport Station via the wide gate (designed for handicapped access) that does not have the capability to count passengers.
2 Airport Station was closed on six weekends during September and October 1997 due to construction.
3 Airport Station was closed on eight weekend days during 2003.
NA Not available.

Table G-4 Logan Airport Employee Parking Supply (September 2007)

	Number of Spaces	
Location	2006	2007
Terminal Area	553	NA
North Service Area	915	NA
Southwest Service Area	10	NA
South Service Area	1,260	NA
Total spaces in service	2,738	2,791
Total spaces out of service	2,487	582
Total employee spaces	5,225	3,373

Source: Logan Airport Parking Space Inventory submitted to Massachusetts Department of Environmental Protection (MDEP), September 2007.
Note: Logan Airport Parking Freeze sets a limit of 17,319 commercial and 3,373 employee spaces at the Airport in 2007.
NA Not available.

Table G-5 Logan Airport Commercial Parking Supply (September 2007)

Location	Number of Spaces 2006	2007
Terminal Area		
Central Garage and West Garage	6,442	10,392
Terminal B Garage	2,692	2,640
Citgo Valet Lot	300	0
Logan Airport Hilton	270	241
Terminal E1	262	270
Terminal E2	280	249
Signature (General Aviation)	NA	35
North Service Area		
Economy Lot 2	965	1010
Sky Chef Valet Lot	400	0
South Service Area		
Harborside Hyatt Conference Center and Hotel	215	263
Southwest Service Area	430	416
Former USPS Site		
Total spaces in service	12,256	15,516
Total spaces out of service	3,211	1,803
Total commercial spaces	15,467	17,319

Source: Logan Airport Parking Space Inventory submitted to MDEP, September 2007.
Note: Logan Airport Parking Freeze sets a limit of 17,319 commercial and 3,373 employee spaces at the Airport in 2007.

Table G-6 2007 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
1	750	35	1,515	1,108	9,661	20,128	215.19	157.34	1,372.36	2,859.09
2	1535	35	775	868	5,554	11,570	225.34	252.25	1,614.54	3,363.63
3	1080	35	2,241	2,094	15,215	31,698	458.39	428.26	3,112.17	6,483.68
4	361	35	1,165	878	6,293	13,110	79.62	60.05	430.24	896.33
5	721	30	1,180	1,221	8,922	18,588	161.08	166.70	1,218.38	2,538.29
6	1110	35	422	528	3,935	8,199	88.67	110.91	827.34	1,723.62
7	1035	35	779	696	4,987	10,389	152.71	136.34	977.55	2,036.57
8	992	30	1,448	2,263	17,129	35,685	272.10	425.24	3,218.12	6,704.42
9	851	30	1,621	1,480	11,096	23,117	261.21	238.52	1,788.45	3,725.94
10	366	30	1,082	1,833	13,816	28,784	74.97	127.09	957.72	1,995.24
11	189	20	367	430	3,312	6,901	13.13	15.39	118.57	247.02
12	892	30	1,378	1,299	9,732	20,276	232.82	219.49	1,644.16	3,425.34
13	209	20	243	181	1,364	2,842	9.60	7.15	54.00	112.49
14	169	20	243	181	1,364	2,842	7.76	5.78	43.66	90.96
15	50	15	11	4	36	75	0.11	0.04	0.34	0.71
16	226	20	231	177	1,328	2,767	9.89	7.57	56.84	118.43
17	168	20	402	471	3,653	7,610	12.80	14.97	116.23	242.14
18	472	20	410	483	3,653	7,610	36.68	43.22	326.55	680.31
19	225	20	254	155	1,328	2,767	10.82	6.61	56.59	117.90
20	50	15	2	12	36	75	0.02	0.12	0.34	0.71
21	580	25	57	147	1,027	2,140	6.30	16.18	112.82	235.03
22	620	25	170	99	941	1,961	19.99	11.61	110.54	230.29
23	315	20	86	68	423	881	5.11	4.09	25.22	52.54
24	1050	30	666	558	4,638	9,662	132.41	111.00	922.30	1,921.47
25	568	30	601	1,240	9,178	19,122	64.67	133.42	987.37	2,057.02
26	315	20	256	167	1,364	2,842	15.26	9.99	81.38	169.54
27	475	20	168	392	2,851	5,939	15.13	35.23	256.47	534.32
28	590	25	431	849	6,327	13,182	48.20	94.89	707.04	1,473.01
29	315	20	353	336	2,626	5,471	21.06	20.06	156.66	326.37
30	437	20	503	730	5,477	11,410	41.59	60.42	453.29	944.36
31	432	20	739	617	4,621	9,628	60.48	50.50	378.10	787.71
32	387	30	669	682	5,111	10,648	49.01	50.00	374.61	780.45
33	168	35	21	39	274	571	0.68	1.25	8.71	18.16
34	295	35	580	434	3,346	6,972	32.42	24.23	186.97	389.52
35	605	20	548	939	6,329	13,185	62.79	107.65	725.18	1,510.78
37	450	20	816	443	4,182	8,713	69.56	37.78	356.43	742.56
38	488	30	1,427	1,150	9,293	19,361	131.85	106.31	858.91	1,789.39

Table G-6 2007 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
39	98	30	220	628	3,897	8,118	4.09	11.65	72.33	150.68
40	470	20	328	312	2,432	5,067	29.17	27.77	216.49	451.01
41	96	30	657	1,464	10,224	21,301	11.95	26.61	185.90	387.28
42	64	15	17	63	295	615	0.21	0.77	3.58	7.46
43	67	30	636	1,441	9,929	20,685	8.08	18.29	125.99	262.48
44	64	30	65	28	295	615	0.79	0.34	3.58	7.46
45	154	30	610	1,498	10,224	21,301	17.78	43.70	298.21	621.27
46	351	30	463	1,153	7,690	16,022	30.78	76.63	511.23	1,065.07
47	222	20	147	346	2,534	5,279	6.16	14.53	106.54	221.96
48	327	20	509	385	2,987	6,224	31.51	23.82	185.01	385.44
49	366	30	918	766	6,306	13,137	63.62	53.07	437.11	910.64
50	58	20	461	659	4,966	10,346	5.07	7.24	54.55	113.65
51	0	-	829	689	5,044	10,508	0.00	0.00	0.00	0.00
52	168	20	481	692	4,966	10,346	15.31	22.01	158.01	329.18
53	0	-	735	380	3,346	6,972	0.00	0.00	0.00	0.00
54	176	20	583	316	2,987	6,224	19.42	10.55	99.58	207.45
56	181	30	463	1,153	7,690	16,022	15.87	39.52	263.63	549.22
58	383	30	913	774	6,306	13,137	66.21	56.15	457.41	952.93
59	443	30	937	1,847	12,656	26,367	78.65	154.93	1,061.88	2,212.25
60	438	30	1,497	1,090	9,293	19,361	124.19	90.42	770.90	1,606.05
61	313	35	179	315	2,331	4,857	10.58	18.70	138.20	287.92
62	125	30	1,319	775	6,962	14,504	31.22	18.34	164.81	343.36
63	185	30	614	1,345	8,928	18,600	21.51	47.11	312.81	651.69
64	315	25	324	502	3,728	7,768	19.30	29.94	222.44	463.41
65	173	25	230	246	1,968	4,101	7.54	8.04	64.49	134.36
65	440	25	230	246	1,968	4,101	19.16	20.46	164.03	341.73
66	150	20	319	239	2,078	4,329	9.07	6.80	59.03	122.98
67	200	25	520	567	4,528	9,434	19.70	21.48	171.53	357.35
197	476	25	76	96	3,951	8,408	6.87	8.62	356.18	742.04
68	1000	25	15	19	766	8,231	2.80	3.51	145.04	302.18
69	980	25	78	75	766	1,595	14.41	13.98	142.14	296.13
69	307	25	78	75	766	1,595	4.52	4.38	44.53	92.77
70	567	15	73	262	1,985	4,135	7.87	28.13	213.15	444.05
71	295	30	503	572	7,798	16,247	28.09	31.98	435.71	907.72
72	162	30	1,158	2,248	16,726	34,846	35.54	68.96	513.19	1,069.15
72	348	20	1,132	2,197	16,726	34,846	74.62	144.78	1,102.41	2,296.68
73	609	30	1,344	1,043	8,947	18,639	155.05	120.30	1,031.91	2,149.82
74	295	30	789	560	4,785	9,969	44.06	31.30	267.34	556.95

Table G-6 2007 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
75	555	30	556	483	4,162	8,670	58.42	50.74	437.45	911.36
76	443	30	647	1,433	10,313	21,485	54.29	120.23	865.25	1,802.60
77	425	30	496	746	6,414	13,361	39.95	60.08	516.24	1,075.50
78	272	25	184	228	2,281	4,752	9.48	11.73	117.52	244.83
79	579	30	312	519	4,132	8,609	34.25	56.89	453.15	944.06
80	230	25	256	303	3,047	6,348	11.14	13.21	132.73	276.52
81	402	30	90	89	701	1,460	6.86	6.79	53.35	111.14
82	650	30	482	357	3,461	7,210	59.32	43.90	426.07	887.65
83	236	30	478	611	4,833	10,069	21.37	27.29	216.02	450.05
83	98	30	478	611	4,833	10,069	8.87	11.33	89.70	186.88
84	629	30	872	1,928	14,487	30,182	103.90	229.65	1,725.86	3,595.53
85	463	30	522	1,140	8,947	18,639	45.79	99.98	784.53	1,634.44
86	251	30	354	801	5,541	11,543	16.84	38.06	263.39	548.73
87	1852	35	789	1,183	9,001	18,753	276.67	415.00	3,157.32	6,577.76
88	630	30	219	196	1,569	3,270	26.16	23.36	187.26	390.12
88	307	25	219	196	1,569	3,270	12.75	11.38	91.25	190.11
89	628	35	569	364	3,215	6,699	67.71	43.35	382.45	796.77
90	395	35	567	861	3,761	7,835	42.41	64.42	281.35	586.14
91	808	35	1,162	2,083	12,708	26,474	177.82	318.83	1,944.64	4,051.32
92	716	35	414	863	5,604	11,676	56.12	117.00	760.00	1,583.34
93	582	35	730	1,210	7,103	14,798	80.42	133.39	782.95	1,631.14
93	151	35	730	1,210	7,103	14,798	20.86	34.61	203.14	423.20
93	1075	35	730	1,210	7,103	14,798	148.53	246.38	1,446.17	3,012.85
94	768	50	414	863	5,604	11,676	60.20	125.50	815.20	1,698.33
95	1722	30	182	187	1,437	2,993	59.22	60.95	468.59	976.23
96	1615	30	264	419	3,396	7,075	80.77	128.24	1,038.81	2,164.19
97	1558	35	292	373	3,050	6,354	86.28	110.04	899.94	1,874.87
98	1449	35	675	594	4,673	9,735	185.27	163.05	1,282.32	2,671.50
99	1114	35	948	965	7,722	16,089	199.94	203.61	1,629.33	3,394.43
100	458	35	1,658	1,475	12,013	25,028	143.79	127.92	1,042.07	2,170.99
101	1255	30	726	507	4,291	8,939	172.63	120.58	1,019.91	2,124.82
102	369	25	938	819	6,546	13,637	65.56	57.24	457.44	953.01
103	391	25	929	813	6,493	13,528	68.77	60.19	480.86	1,001.79
106	249	25	235	899	3,136	6,534	11.07	42.42	147.90	308.13
107	77	25	115	537	1,809	3,769	1.68	7.83	26.39	54.97
108	185	15	54	54	288	600	1.89	1.89	10.08	21.01
109	263	25	82	84	554	1,154	4.11	4.17	27.58	57.47
111	200	20	70	71	455	948	2.64	2.69	17.24	35.91

Table G-6 2007 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
112	200	20	47	61	455	948	1.78	2.31	17.24	35.91
113	20	15	13	13	99	206	0.05	0.05	0.37	0.78
115	327	20	60	74	554	1,154	3.69	4.56	34.30	71.45
116	148	20	32	33	266	554	0.91	0.94	7.45	15.53
117	369	25	140	569	2,042	4,255	9.79	39.79	142.74	297.37
118	216	25	35	40	340	709	1.45	1.64	13.93	29.02
118	151	25	35	40	340	709	1.01	1.15	9.74	20.28
120	372	25	908	788	6,273	13,069	63.96	55.50	441.97	920.77
121	372	25	251	915	3,260	6,791	17.66	64.49	229.65	478.45
122	2801	25	392	793	4,480	9,334	208.05	420.43	2,376.80	4,951.67
123	2801	25	743	634	4,480	9,334	393.95	336.35	2,376.80	4,951.67
124	1150	25	749	971	4,260	8,876	163.13	211.54	927.91	1,933.14
125	1150	25	982	1,043	7,274	15,154	213.85	227.26	1,584.25	3,300.52
126	850	25	132	44	787	1,639	21.22	7.07	126.65	263.85
127	850	25	33	200	1,085	2,261	5.38	32.25	174.71	363.99
128	939	25	848	1,516	7,595	15,823	150.82	269.58	1,350.75	2,814.05
129	939	25	1,093	997	7,642	15,921	194.36	177.27	1,359.03	2,831.32
130	580	35	134	450	2,668	5,559	14.68	49.39	293.11	610.65
131	660	35	889	1,666	11,670	24,312	111.08	208.26	1,458.72	3,039.00
134	65	25	114	177	1,354	2,820	1.41	2.17	16.67	34.72
135	155	25	378	1,261	8,050	16,772	11.11	37.03	236.33	492.35
136	151	25	1,223	949	8,050	16,772	34.97	27.13	230.23	479.64
137	227	25	429	945	6,747	14,057	18.44	40.63	290.08	604.34
138	608	25	429	945	6,747	14,057	49.39	108.82	776.96	1,618.66
139	369	35	730	1,313	9,797	20,411	51.04	91.76	684.68	1,426.43
141	583	30	994	1,733	13,193	27,486	109.76	191.36	1,456.76	3,034.91
142	450	30	840	784	6,109	12,728	71.62	66.79	520.69	1,084.77
143	3340	9060	2325	25	53	70	408	850	23.16	31.01
144	3080	3320	2050	25	76	103	816	1,700	29.44	39.81
145	3071	3081	372	25	76	103	816	1,700	5.34	7.22
145	3081	3080	275	25	76	103	816	1,700	3.95	5.34
146	1317	25	239	554	3,957	8,243	59.60	138.08	986.92	2,056.09
147	1317	25	422	499	4,593	9,569	105.35	124.37	1,145.68	2,386.84
148	575	25	456	351	2,939	6,123	49.69	38.27	320.07	666.81
149	575	25	223	515	2,939	6,123	24.32	56.06	320.07	666.81
150	1119	25	138	118	1,550	3,230	29.33	25.00	328.58	684.54
151	1819	25	94	221	2,187	4,556	32.54	76.28	753.40	1,569.58
152	1358	25	479	512	4,593	9,569	123.10	131.65	1,181.35	2,461.15

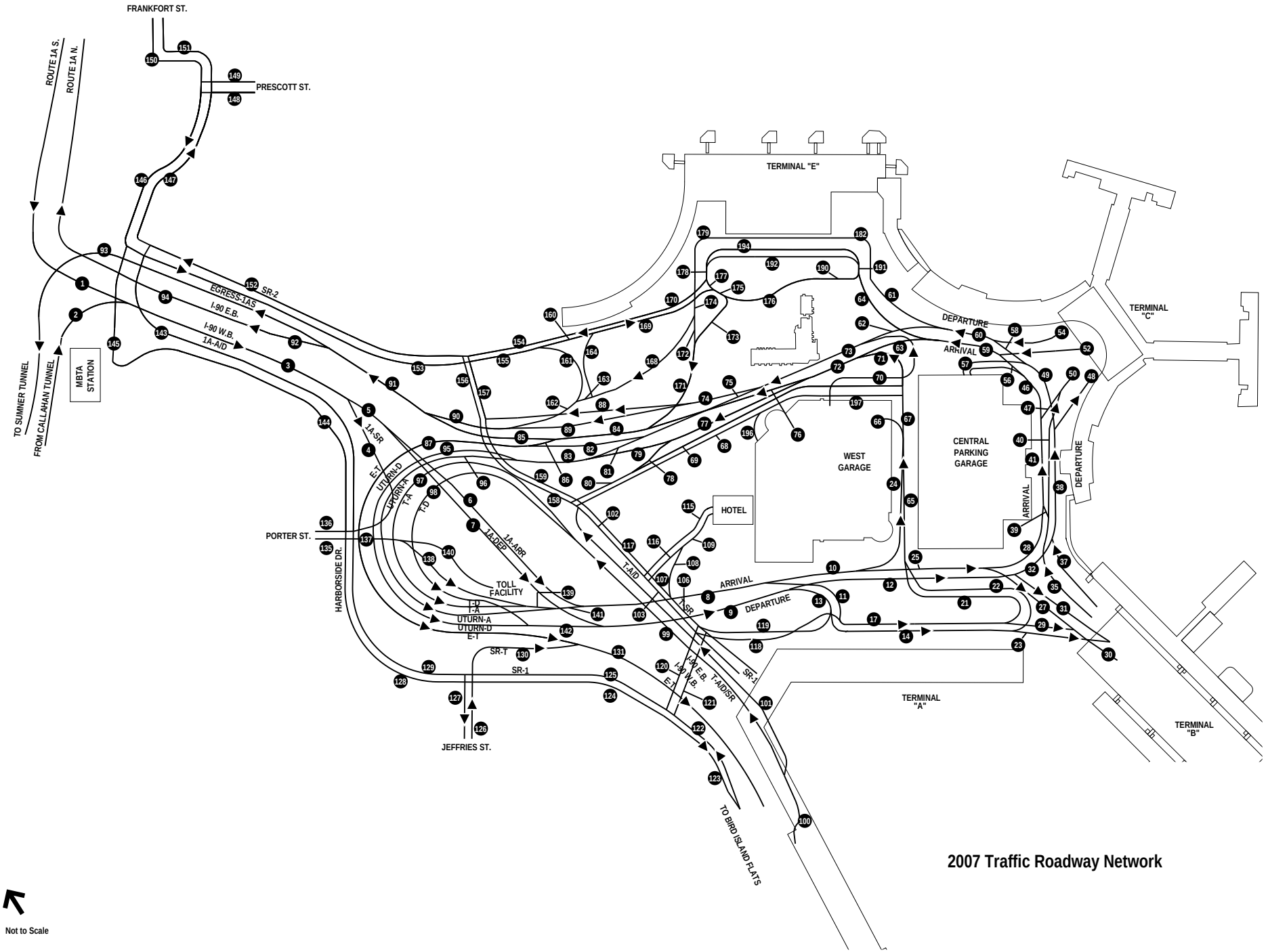
Table G-6 2007 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
152	431	25	479	512	4,593	9,569	39.07	41.78	374.94	781.11
153	986	25	267	822	3,549	7,393	49.85	153.49	662.69	1,380.61
153	431	25	267	822	3,549	7,393	21.79	67.09	289.68	603.49
153	372	25	267	822	3,549	7,393	18.81	57.91	250.02	520.88
154	610	25	211	241	1,939	4,040	24.43	27.86	224.04	466.75
155	240	25	223	869	1,348	2,808	10.12	39.48	61.27	127.64
156	253	25	475	495	4,413	9,194	22.78	23.71	211.47	440.56
157	254	25	644	1,023	4,866	10,138	30.97	49.20	234.10	487.72
158	626	25	470	487	4,348	9,058	55.67	57.77	515.48	1,073.92
159	626	25	409	813	3,232	6,733	48.50	96.40	383.15	798.24
160	610	25	60	77	1,348	2,808	6.96	8.94	155.73	324.43
161	302	25	0	0	0	0	0.00	0.00	0.00	0.00
162	297	25	14	71	181	377	0.80	3.99	10.18	21.20
163	72	25	0	13	181	377	0.00	0.18	2.47	5.14
164	990	25	114	163	1,173	2,444	21.43	30.64	219.92	458.17
165	50	15	0	21	120	250	0.00	0.20	1.14	2.37
166	50	35	114	156	1,234	2,570	1.08	1.48	11.68	24.34
167	50	15	3	17	120	250	0.03	0.16	1.14	2.37
168	420	35	117	173	1,354	2,820	9.32	13.75	107.69	224.35
169	310	25	68	109	1,556	3,243	4.01	6.42	91.38	190.38
170	310	25	209	229	1,939	4,040	12.26	13.44	113.86	237.20
171	295	25	230	506	4,175	8,697	12.85	28.27	233.24	485.92
172	108	25	69	98	978	2,036	1.41	2.01	19.99	41.66
173	115	25	162	406	3,197	6,661	3.53	8.84	69.63	145.07
174	302	25	186	271	2,331	4,857	10.64	15.51	133.34	277.80
175	165	25	192	480	3,816	7,951	5.99	15.00	119.26	248.47
176	365	25	30	74	619	1,290	2.04	5.10	42.81	89.20
177	105	25	122	356	2,260	4,708	2.42	7.07	44.94	93.63
178	45	25	331	585	4,199	8,748	2.82	4.98	35.79	74.56
179	464	20	186	271	2,331	4,857	16.35	23.82	204.87	426.82
180	50	15	77	131	1,520	3,166	0.73	1.24	14.39	29.98
181	50	15	57	156	1,520	3,166	0.54	1.48	14.39	29.98
182	602	20	179	315	2,331	4,857	20.35	35.97	265.81	553.76
183	50	15	17	62	405	843	0.16	0.59	3.83	7.99
184	50	25	12	11	215	447	0.12	0.11	2.03	4.23
185	50	15	10	65	405	843	0.09	0.62	3.83	7.99
186	50	25	22	76	619	1,290	0.21	0.72	5.87	12.22
187	50	15	10	4	82	171	0.10	0.04	0.78	1.62

Table G-6 2007 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
188	40	25	11	72	537	1,119	0.09	0.55	4.07	8.48
189	50	15	2	11	82	171	0.02	0.11	0.78	1.62
190	50	15	13	83	619	1,290	0.12	0.79	5.87	12.22
191	85	25	336	581	4,321	9,001	5.41	9.36	69.55	144.90
192	450	20	301	289	2,260	4,709	25.66	24.60	192.65	401.35
193	520	20	35	293	2,060	4,292	3.43	28.84	202.89	422.69
194	450	20	41	310	2,060	4,292	3.53	26.44	175.58	365.79
195	405	20	299	291	2,260	4,709	22.91	22.33	173.38	361.22
196	200	15	6	13	85	177	0.24	0.50	3.22	6.71
				LOGAN AIRPORT ITM VMT ANALYSIS:			9,594	12,304	88,614	184,613

AWDT = Average annual weekday daily traffic



2007 Traffic Roadway Network

Not to Scale

H

Noise Abatement

This appendix provides detailed information, tables, and figures in support of *Chapter 6, Noise Abatement*:

- Logan Airport RealContours™ Data Inputs
  - Figure H-1 Schematic Noise Modeling Process (Standard INM vs. RealContours™)
  - Table H-1 2007 Annual Modeled Operations
  - Table H-2 2007 Modeled Runway Use by Aircraft Group
  - Figure H-2 Comparative Shift in Jet Departures from Runway 27 to Runway 33L
  - Figure H-3 Availability of Northwesterly Winds When Runway 14-32 Could Be Used
  - Table H-3 Total Count of Flight Tracks Modeled in RealContours™ (2007)

- Residential Sound Insulation Program
  - Table H-4 Residential Sound Insulation Program Status (1986-2007)
  - Table H-5 Schools Treated Under Massport Sound Insulation Program

- Noise Exposed Population
  - Table H-6 Noise-Exposed Population by Community
  - Table H-7 Noise Complaint Line Summary

- History of Operations, Runway Use and CNI
  - Table H-8 Modeled Daily Operations by Commercial and General Aviation Aircraft – 1990 to 2007
  - Table H-9 Percentage of Commercial Jet Operations by Part 36 Stage Category – 1990 to 2007
  - Table H-10 Modeled Nighttime Operations at Logan Airport – 1990 to 2007
  - Table H-11 Summary of Jet Aircraft Runway Use – 1990 to 2007
  - Table H-12 Cumulative Noise Index (EPNdB) – 1990 to 2007

- Flight Track Monitoring Report
  - Figure H-4 Logan Airport Gates
  - Table H-13 Runways 4R/4L Nahant Gate Summary for 2007
  - Table H-14 Runways 4R/4L Shoreline Crossings Above 6,000 Feet for 2007
  - Table H-15 Runway 9 Gate Summary – Winthrop Gates 1 and 2 for 2007
  - Table H-16 Runway 9 Shoreline Crossings Above 6,000 Feet for 2007
  - Table H-17 Runway 15R Shoreline Crossings Above 6,000 Feet for 2007
  - Table H-18 Runways 22R/22L Squantum 2 Gate Summary for 2007
  - Table H-19 Runways 15R/22R/22L Gate Summary – North of Hull Peninsula for 2007
  - Table H-20 Runways 22R/22L Shoreline Crossings Above 6,000 Feet for 2007
  - Table H-21 Runway 27 Corridor Percent of Tracks Through Each Gate for 2007
  - Table H-22 Runway 33L Gates – Passages Below 3,000 Feet for 2007

- INMv7.0 Contour Improvements
  - Figure H-5 Comparison of the 65 dB DNL Contours for 2007 Operations Using INMv6.2a and INMv7.0

Logan Airport RealContours™ Data Inputs

For this *2007 EDR*, Massport has produced a set of noise contours, time above (TA) noise metrics, and population counts for 2007 using the pair of software packages RealProfiles™ and RealContours™. This software incorporates the latest version of the Federal Aviation Administration (FAA) Integrated Noise Model (INM) Version 7.0 and 6.2a as the computational "engine" for calculating noise, but uses individual flight tracks taken directly from the Massport radar system rather than relying on consolidated data summaries. For 2007, the radar systems retained suitable data for 351,049 flights; all of these were used in the noise model directly.

Introduction

Standard INM methodology involves development of operational inputs and calculation of the Day-Night Sound Level (DNL) for a prototypical average annual day. This approach requires manually collecting, refining, and entering the enormous amount of data related to a full year of activity at an airport. For example, the model inputs may include an aircraft fleet mix with several dozen representative aircraft types, numerous representative flight tracks (on the order of 100 to 300 is common for an airport comparable to Logan Airport), and runway use and flight track use percentages for three or four categories of aircraft types with similar performance characteristics.

This approach meets accepted professional standards, and reduces the effort and cost that would be associated with manually entering the parameters for every actual operation. However, it represents a significant simplification of the extraordinary diversity of actual aircraft operations over a year. It also does not take full advantage of the investment that Massport has made in installing and maintaining a state-of-the-art radar system[1], which automatically collects flight track data and flight identification data for all operations at the Airport.

For this report, Massport has selected an INM pre-processor, named RealContours™, which takes maximum possible advantage of both the INM's capabilities and the investment that the Massport has made in operations monitoring. RealContours™ automates the process of preparing the INM inputs directly from the actual flight operations, and permits airports to model the full diversity of activity as precisely as possible, at a cost equivalent to the more simplified manual approach. RealContours™ improves the precision of modeling by utilizing operations monitoring results in four key areas:

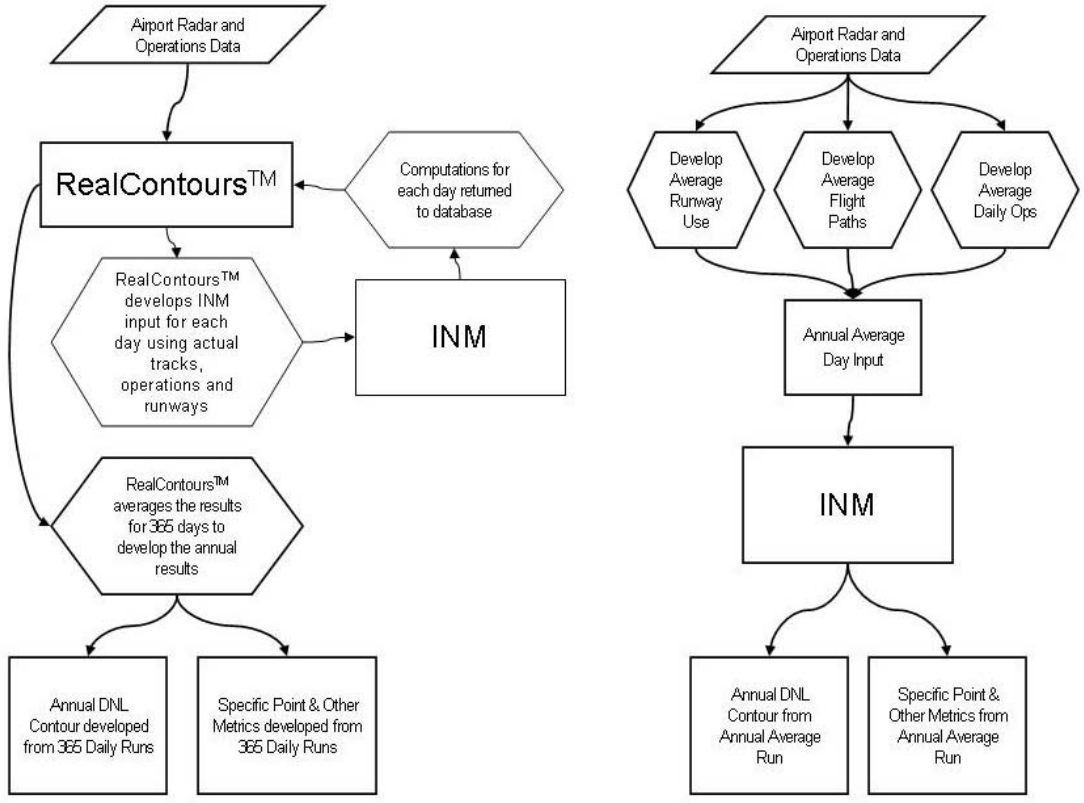
- Directly converts the flight track for every identified aircraft operation to an INM track, rather than assigning all operations to a limited number of prototypical tracks.
- Models each operation on the specific runway that it actually used, rather than applying a generalized distribution to broad ranges of aircraft types.
- Selects the specific airframe and engine combination to model, on an operation-by-operation basis, based on the published composition of the fleets of the specific airlines operating at Logan Airport.
- Uses each aircraft's actual performance and altitude profile to develop inputs to the model which define the actual arrival or departure profile.

1 The Massport system utilizes the PASSUR™ product of Megadata Corporation and the data is processed using PREFlight™ from HMMH, Inc.

As defined in the INM User's Guide, the annual day-night average sound level (YDNL) is used for quantifying airport noise. The YDNL is the 365-day average, day-night average sound level. To use this definition to model noise in INM, one would have to run 365 cases of the model and average the results. Since this is time consuming and impractical, the current practice is to average the 365 days of data before the run and design one input file. However, RealContours™ accomplishes this task by using the actual radar data to develop INM input files for each day of the year and then averaging the results to obtain the annual contour.

Figure H-1 provides a schematic representation of the RealContours™ noise modeling process compared to the standard INM process.

Figure H-1 Schematic Noise Modeling Process (Standard INM vs. RealContours™)



2007 Radar Data

Logan Airport's radar data provide the key to the RealContours™ system. Since February 2004, Massport has collected PASSUR radar data which supplies information to the Airport's web-based Airport Monitor software. Massport was able to collect 360 complete days of data for 2007, with approximately 91.5 percent of these tracks usable for the development of the noise exposure contours. Massport was unable to collect data for five days in May when the radar data system was down.

Fleet Mix

The 2007 radar data first were processed to establish a baseline set of operations. After processing 360 days of radar data, 351,049 flight tracks with sufficient data were identified to use as the baseline for the 2007 contour. The operations from these tracks were then scaled upwards by airline and aircraft type to match the reported totals for 2007. Table H-1 provides the scaled annual operations, as modeled, by aircraft type. The INM aircraft types modeled by RealContours™ match the types listed in Table H-1.

Runway Use

RealContours™ obtains its runway use information directly from the radar data based on the actual runways which were used each day throughout the modeled year. The runway use presented here is broken into six representative aircraft groups listed below: (see Table H-2).

- Heavy Jet A – B747s, A340s, DC-8s
- Heavy Jet B – B767s, B777s, A300s, A310s, A330s, DC-10s, L1011s, MD-11s
- Light Jet A – B717s, B727s, DC-9s, F100s, MD-90s
- Light Jet B – B737s, B757s, A319s, A320s, B-146s, MD-80s
- Regional Jet – E135, E145, E170, E190, CRJ2, CRJ7, CRJ9, J328 and Corporate Jets
- Turboprops and Piston Aircraft (Non-Jets)

The runway use has been grouped in this format to allow comparison with prior years.

Table H-2 shows the runway use that was used to model the 2007 noise conditions. As described above, turbojet aircraft in the table were grouped into different categories for reporting purposes. Because the 2007 contour developed using RealContours™ reflects the individual use of the runways by each INM aircraft type, it accurately represents Logan Airport's noisiest aircraft by modeling them on the actual runways that they used during the year. The modeled runway use for each particular aircraft type may be different than the overall group runway use presented in Table H-2.

Table H-1 2007 Annual Modeled Operations

INM Type	Runway Use Group	Arrivals Day	Arrivals Night	Departures Day	Departures Night	Total
Commercial Jet Operations						
717200	LJA	7327	839	7445	860	16471
727EM1	LJA	4	12	6	10	31
727EM2	LJA	514	1056	349	1080	3000
727Q15	LJA	0	2	0	3	6
727Q9	LJA	0	12	1	5	19
727QF	LJA	3	15	3	6	27
737300	LJB	2421	256	2031	490	5198
7373B2	LJB	1027	335	989	339	2691
737400	LJB	2026	125	1869	306	4326
737500	LJB	3531	467	3582	403	7983
737700	LJB	4052	618	3945	717	9332
737800	LJB	3059	1114	3537	595	8305
737N17	LJB	33	1	26	2	62
737N9	LJB	16	2	20	1	40
74720B	HJA	849	18	637	207	1711
747400	HJA	51	2	34	19	106
757300	LJB	14	241	175	58	488
757PW	LJB	8629	2686	9849	1504	22668
757RR	LJB	4778	1870	5575	1238	13462
767300	HJB	841	57	860	52	1810
737400	HJB	5	0	6	1	13
767CF6	HJB	32	16	48	6	102
777200	HJB	1474	159	1600	56	3289
A30062	HJB	549	1043	638	698	2929
A310	HJB	202	22	17	207	448
A319	LJB	13543	2246	14263	1552	31605
A320	LJB	2310	536	2189	657	5692
A32023	LJB	8070	4213	11338	1078	24699
A330	HJB	1310	2	1227	53	2592
A33034	HJB	177	1	188	2	368
A340	HJA	948	2	882	68	1900
DC1010	HJB	388	194	163	340	1085
DC1030	HJB	220	92	97	150	559
DC86HK	HJA	2	4	6	1	14
DC870	HJA	22	30	11	35	98
DC93LW	LJA	60	2	61	1	124
DC95HW	LJA	121	1	110	2	234
MD11GE	HJB	1	4	7	5	18
MD11PW	HJB	6	1	0	0	7
MD81	LJB	30	2	23	6	61
MD82	LJB	2265	481	2691	116	5553
MD83	LJB	11920	2359	13088	1070	28436
MD9025	LJA	2	0	2	0	4

Table H-1 2007 Annual Modeled Operations (Continued)

INM Type	Runway Use Group	Arrivals Day	Arrivals Night	Departures Day	Departures Night	Total
Commercial Jet Operations (Continued)						
CL600	RJ	3	0	1	0	4
CL601	RJ	22967	1961	23236	1041	49205
CNA55B	RJ	4	0	0	0	4
EMB145	RJ	14261	959	12974	1110	29303
EMB14L	RJ	2590	88	2488	67	5232
EMB17C	RJ	1782	410	1544	429	4164
EMB19C	RJ	8939	1056	8195	771	18960
FAL20	RJ	2	0	2	0	3
FAL900	RJ	1	1	2	0	3
GIV	RJ	3	1	3	0	7
GV (CRJ700 & CRJ900)	RJ	778	74	799	52	1703
IA1125	RJ	1	0	1	0	1
LEAR25	RJ	4	2	3	2	11
LEAR35	RJ	45	2	34	16	97
Total		134210	25692	138868	17489	316259
Commercial Non-Jet Operations						
1900D	NJ	10426	672	10384	229	21710
BEC58P	NJ	14028	193	12277	64	26563
DHC6	NJ	0	1	0	1	2
DHC8	NJ	923	1	907	17	1848
DHC830	NJ	64	0	61	2	127
GASEPF	NJ	0	0	1	0	1
SF340	NJ	2047	22	1904	64	4037
Total		27488	890	25534	375	54287
Commercial Subtotal		161698	26582	164402	17864	370546
General Aviation (GA) Operations						
727EM1	LJA	0	0	1	0	1
727EM2	LJA	8	8	11	1	29
727QF	LJA	4	0	0	0	4
737300	LJB	0	0	0	1	1
7373B2	LJB	1	1	0	1	3
737400	LJB	5	1	3	1	10
737700	LJB	12	0	9	1	22
737N17	LJB	2	1	3	0	7
757PW	LJB	3	1	1	1	7
757RR	LJB	0	0	1	0	1
767300	HJB	6	3	5	1	15
767CF6	HJB	4	0	2	0	6
CIT3	RJ	148	7	130	10	294
CL600	RJ	765	77	757	48	1646
CL601	RJ	543	58	564	55	1220

Table H-1 2007 Annual Modeled Operations (Continued)

INM Type	Runway Use Group	Arrivals Day	Arrivals Night	Departures Day	Departures Night	Total
General Aviation Operations (Continued)						
CNA500	RJ	319	25	308	22	674
CNA55B	RJ	1	0	0	0	1
CNA750	RJ	598	95	587	44	1324
DC86HK	HJA	1	0	2	0	3
DC93LW	LJA	6	0	0	2	8
DC95HW	LJA	2	1	1	0	4
EMB145	RJ	58	11	59	4	131
EMB19C	RJ	1	0	0	0	1
FAL20	RJ	4	2	4	0	10
FAL50	RJ	232	21	225	15	492
FAL900	RJ	231	15	222	14	483
GII	RJ	26	4	39	1	69
GIIB	RJ	163	33	160	15	370
GIV	RJ	655	79	616	62	1412
GV	RJ	404	33	358	41	836
IA1125	RJ	641	49	555	38	1283
J328	RJ	10	2	9	1	22
LEAR25	RJ	32	7	26	7	72
LEAR35	RJ	2635	456	2318	435	5844
MD81	LJB	1	0	1	0	2
MU3001	RJ	3155	313	2808	277	6553
1900D	NJ	9	0	7	1	17
BEC58P	NJ	428	323	404	392	1547
CNA172	NJ	39	0	36	0	75
CNA206	NJ	71	1	62	0	134
CNA441	NJ	181	19	163	24	386
DHC6	NJ	395	16	312	28	750
EMB120	NJ	2	0	2	0	5
GASEPF	NJ	268	80	108	177	633
GASEPV	NJ	306	8	299	9	623
HS748A	NJ	1	0	1	0	2
PA28	NJ	21	0	15	0	36
PA31	NJ	86	70	53	63	271
SD330	NJ	546	62	555	45	1207
SF340	NJ	1	0	0	0	1
Total		13030	1882	11804	1837	28552
Grand Total		174727	28464	176206	19701	399098

Notes: Annual operations converted to daily operations for noise modeling.
User Defined Aircraft.
HJA, HJB Heavy Jets A and B.
LJA, LJB Light Jets A and B.
RJ Regional Jets.
NJ Non-jets.

Table H-2 2007 Modeled Runway Use by Aircraft Group

ARRIVALS

	Heavy Jets - Group A		Heavy Jets - Group B		Light Jets - Group A		Light Jets - Group B		Regional Jets		Turboprops (Non-jets)	
Runway	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
4L	0.68%	0.00%	0.96%	0.45%	3.02%	0.62%	2.60%	0.63%	10.53%	3.09%	19.92%	8.86%
4R	41.73%	25.96%	38.68%	25.94%	34.68%	26.34%	34.94%	26.93%	25.92%	25.35%	19.13%	20.56%
9	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15L	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.24%	0.00%
15R	1.03%	0.00%	1.17%	0.43%	1.03%	0.68%	1.17%	0.71%	0.98%	0.70%	1.35%	0.49%
22L	20.75%	39.91%	10.02%	29.31%	5.53%	26.74%	10.78%	26.97%	15.63%	22.12%	18.07%	30.93%
22R	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.01%	0.03%	0.04%	1.92%	0.91%
27	21.60%	5.84%	39.77%	14.96%	47.16%	21.78%	42.58%	19.84%	32.82%	27.13%	20.15%	14.74%
32	0.00%	0.00%	0.04%	0.00%	0.05%	0.00%	0.03%	0.00%	6.14%	0.61%	12.57%	1.74%
33L	14.21%	28.29%	9.33%	28.91%	8.52%	23.85%	7.89%	24.91%	7.92%	20.96%	5.69%	21.38%
33R	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%	0.97%	0.39%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

DEPARTURES

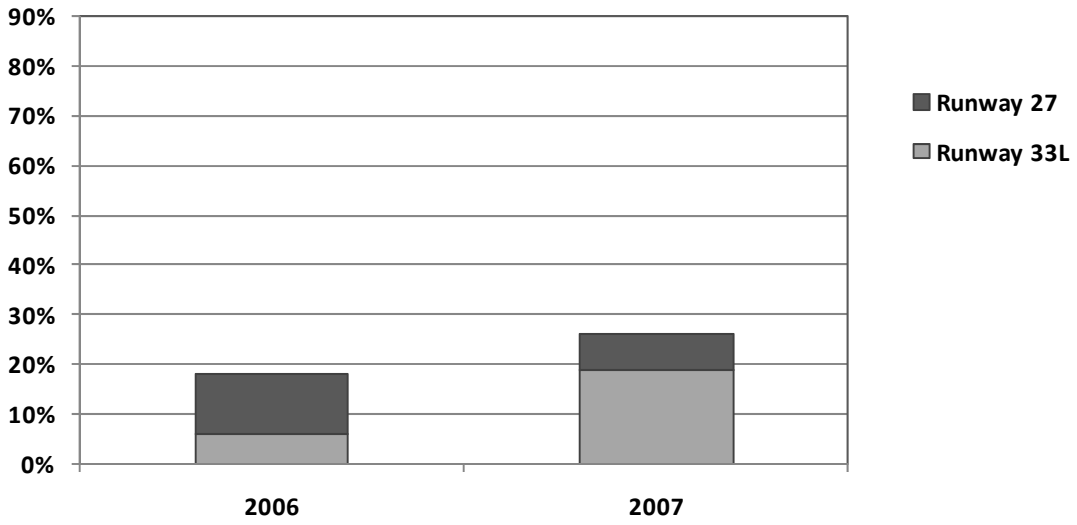
	Heavy Jets - Group A		Heavy Jets - Group B		Light Jets - Group A		Light Jets - Group B		Regional Jets		Turboprops (Non-jets)	
Runway	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
4L	0.14%	0.00%	0.07%	0.00%	0.06%	0.00%	0.02%	0.00%	0.13%	0.05%	13.84%	5.20%
4R	18.91%	6.78%	13.17%	2.97%	1.68%	1.35%	7.17%	4.45%	1.78%	1.85%	6.83%	4.86%
9	6.45%	3.67%	16.58%	20.95%	36.97%	24.94%	29.63%	24.66%	36.59%	28.18%	5.93%	7.49%
14	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.09%	0.05%	0.30%	0.46%
15L	0.00%	0.00%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.33%	1.26%	0.39%
15R	19.32%	46.41%	9.84%	25.52%	1.49%	20.39%	3.18%	10.90%	1.47%	13.69%	17.89%	19.72%
22L	0.34%	0.32%	0.65%	0.37%	0.78%	0.44%	0.97%	0.89%	0.41%	0.50%	1.77%	1.55%
22R	32.75%	20.40%	35.20%	26.88%	33.91%	29.24%	32.94%	32.27%	34.01%	29.92%	25.85%	14.47%
27	0.54%	1.28%	3.50%	6.53%	6.30%	8.39%	6.03%	11.15%	7.29%	12.17%	15.43%	30.18%
32	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
33L	21.55%	21.14%	20.97%	16.79%	18.82%	15.25%	20.07%	15.69%	18.16%	13.23%	10.80%	15.35%
33R	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%	0.11%	0.34%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Departures on Runway 33L

Comparing Table H-2 above with the similar Table H-2 in the *2006 EDR*, the most notable shift that occurred in 2007 is in the percentage of departures using Runway 33L. Runway use of Runway 33L approximately tripled from 2006 to 2007 over all of the jet aircraft categories listed and was partially responsible for the increase in population exposed to DNL values above 65 dB (see later in this appendix).

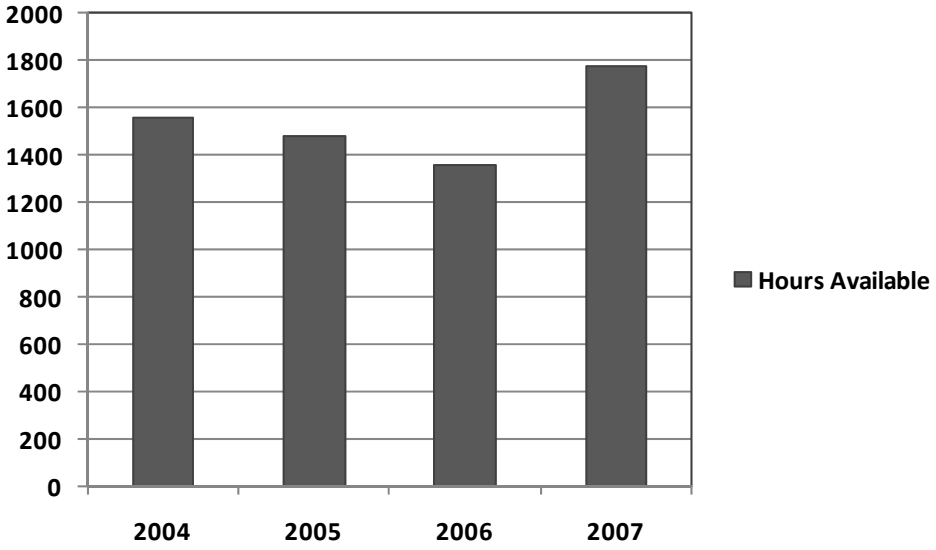
Three factors contributed to this increased utilization: (1) Runway 14-32 was fully operational in 2007 as compared to the limited two-month period that it was operational in 2006; (2) northwest wind conditions permitting use of Runway 14-32 were more prevalent in 2007 than in 2006 (see Figure H-3); and (3) with the increased availability of the new runway, the FAA had greater flexibility in selecting runway configurations that could accommodate the traffic during periods of high demand. The combined effects of these factors resulted in a shifting of departures from Runway 27 to Runway 33L as illustrated in Figure H-2.

Figure H-2 Comparative Shift in Jet Departures from Runway 27 to Runway 33L



A 30 percent increase in northwesterly winds from 2006 to 2007 is significant change in weather/wind. Within the north-west operating flow, departures on Runway 33L increased to 19 percent in 2007 from 6 percent in 2006. Overall, the Airport continued to favor a north-south operating flow in 2007 as shown with the percentage of jet departures by operating direction in Figure 6-4 of *Chapter 6, Noise Abatement*. Runway 22R and Runway 9 remained by far the most heavily used runways for departures throughout the period.

Figure H-3 Availability of Northwesterly Winds When Runway 14-32 Could Be Used



Flight Tracks

RealContours™ converts each radar track to an INM model track and then models the scaled aircraft operation on that track. This method keeps the lateral and vertical dispersion of the aircraft types consistent with the radar data, and ensures that anomalies in the departure paths are captured in the RealContours™ system. Table H-3 lists the number of flight tracks used in the RealContours™ modeling system for 2007.

Table H-3 Total Count of Flight Tracks Modeled in RealContours™ (2007)

	Runway											
	4L	4R	9	14	15L	15R	22L	22R	27	32	33L	33R
Departures	3,310	9,118	48,835	99	230	9,151	1,438	55,715	13,462	0	31,337	38
Arrivals	12,126	52,034	0	0	40	1,898	27,657	452	59,806	5,985	18,153	165

Flight Profiles

To further enhance the results from RealContours™, Massport elected to use the companion RealProfiles™ software. By using the actual radar information along with the equations developed for the INM, RealProfiles™ develops an altitude profile for each aircraft operation. This profile is then modeled in the RealContours™ system. As a result, the modeled aircraft follows both the actual radar track on the ground and the actual radar altitude profile in the sky.

RealProfiles™ provides several advantages over the standard INM profile modeling. The standard INM modeling uses a "Stagelength" to identify an aircraft's departure weight and then models a standard departure profile for that Stagelength. Using Realprofiles™, the RealContours™ system selects a weight similar to the standard

modeling but then develops a profile to allow the INM aircraft to follow the actual path flown for that route. For example, if aircraft departing from a particular runway are required to remain level at 3,000 feet for a certain distance, RealProfiles™ will develop a profile that remains level for that distance along the track. In contrast, the standard modeling would use the standard INM profile and would not model the level segment.

RealProfiles™ was able to compute profiles based on the actual radar data for 83.3 percent of the available flight tracks. Most of the 16.7 percent that could not be used for RealProfiles™ were arrivals. The standard INM arrival profile was used for arriving aircraft that did not have the necessary data in the INM database to be used in RealProfiles™.

Residential Sound Insulation Program

In 2007, Massport completed sound insulation of 160 residential buildings containing 548 dwelling units, resulting in a total of 4,951 residential buildings and 10,461 dwelling units that have been sound insulated since 1986 when the program was first implemented. Table H-4 lists the yearly progress of this mitigation effort.

Table H-4 Residential Sound Insulation Program Status (1986-2007)

Construction Year	Residential Buildings[1]	Dwelling Units[2]
1986	4	8
1987	43	51
1988	102	159
1989	94	133
1990	121	200
1991	175	360
1992	197	354
1993	318	654
1994	310	542
1995	372	753
1996	323	577
1997	364	808
1998	328	806
1999	330	718
2000	195	601
2001	260	278
2002	205	354
2003	230	468
2004	320	791
2005	314	471
2006	286	827
2007	160	548
Total	5,051	10,461

1 Includes multiple units.
2 Individual units.

Following the FAA's approval of model adjustments based on the effects of terrain (discussed in the *1999 ESPR*) Massport submitted, and the New England Region of the FAA-approved, a new sound insulation program. The revised contour, approved for a two-year period beginning in 1999, included dwelling units in East Boston, South Boston, and Winthrop that previously had not been eligible for insulation. Massport received notice of FAA funding in the amount of $5 million. Subsequently, Massport updated its program contour, first with the *2001 EDR* contour and more recently with the Logan Airside Improvements Project approved contour. These updates have allowed Massport to continue the program with additional funds every year since 1999. This latest update takes into account runway use changes due to the new Runway 14-32 which opened in late November 2006. This update expands the focus of the sound insulation program into Chelsea. Table H-5 provides a list of all schools that have been treated under Massport's sound insulation program. To date, Massport has provided sound insulation to 36 schools at a cost of over $8 million.

Table H-5 Schools Treated Under Massport Sound Insulation Program

Boston:					
East Boston			Winthrop		
East Boston High		$381,948	Winthrop Jr. High School		$63,756
St. Mary's Star of the Sea		$80,901	E. B. Newton		$184,674
St. Dominic Savio High		$127,879	A. T. Cummings (Ctr.) School		$800,000
St. Lazurus		$46,092	3	Total Winthrop Schools	$1,048,430
James Otis		$46,092			
Samuel Adams		$120,650			
Curtis Guild		$180,572	Revere		
Dante Alighieri		$97,750	Beachmont School		$854,864
P.J. Kennedy		$127,637	1	Total Revere School	$854,864
Donald McKay		$231,754			
Hugh Roe O'Donnell		$113,564	Chelsea		
E Boston Central Catholic		$391,768	Shurtleff School		$292,207
Manassah Bradley		$237,500	Williams School		$486,258
13	East Boston Schools	$2,184,107	St. Rose Elementary		$46,396
			St. Stanislaus		$66,298
South Boston:			Chelsea High School		$524,249
St. Augustine		$92,855	5	Total Chelsea Schools	$1,415,408
Cardinal Cushing		$47,276			
Patrick Gavin		$217,077	36	Total Schools	$8,159,020
St. Bridgid's		$112,100			
Oliver Hazard Perry		$337,538			
Condon School		$294,481			
6	South Boston Schools	$1,101,327			
Roxbury & Dorchester:					
Samuel Mason		$192,401			
Dearborn Middle		$248,238			
Ralph Waldo Emerson		$155,851			
Lewis Middle		$202,092			
Nathan Hale Elem.		$92,302			
Phillis Wheatley Elem.		$290,794			
Davis Ellis Elem.		$253,663			
Henry L. Higginson		$119,543			
8	Roxbury & Dorchester Schools	$1,554,884			
27	Total Boston Schools	$4,840,318			

Source: Massport.

Noise Exposed Population

Table H-6 presents the noise exposed population by community for 2007. This table includes population within the 60-65 dB DNL contours, although a DNL of 65 dB is the federally-defined noise criterion used as a guideline to identify when residential land use is considered incompatible with aircraft noise. The 2007 results using INMv6.2a and INMv7.0 are presented in the table.

Table H-6 Noise-Exposed Population by Community

Year	Census Data	80+ dB DNL	75-80 dB DNL	70-75 dB DNL	65-70 dB DNL[1]	Total (65+)	60-65 dB DNL
BOSTON[2]							
1990	1980	0	0	1,778	28,970	30,748	NA
1992	1980	0	0	800	4,316	5,116	NA
1993	1980	0	0	264	2,820	3,084	NA
1994	1990	0	106	265	7,698	8,069	30,895
1995	1990	0	106	851	8,815	9,772	33,765
1996	1990	0	106	374	8,775	9,255	40,992
1997	1990	0	106	719	13,857	14,682	54,804
1998	1990	0	58	580	10,877	11,515	52,201
1999[3]	1990	0	58	364	11,632	12,054	45,948
2000[3]	1990	0	58	183	7,880	8,121	32,474
2000[3]	2000	0	0	234	9,014	9,248	35,785
2001[3]	2000	0	0	315	6,515	6,700	27,778
2002[3]	2000	0	0	132	2,625	2,757	23,225
2003[3]	2000	0	0	164	1,730	1,894	21,763
2004[3,4]	2000	0	65	192	4,142	4,399	24,473
2005[3,4]	2000	0	65	104	2,020	2,189	17,661
2006[4]	2000	0	65	99	1,054	1,218	14,866
2007 (INMv6.2a)[4]	2000	0	0	169	4,113	4,282	20,112
2007 (INMv7.0)[4]	2000	0	0	169	3,586	3,755	19,433
CHELSEA							
1990	1980	0	0	0	4,813	4,813	NA
1992	1980	0	0	0	3,952	3,952	NA
1993	1980	0	0	0	0	0	NA
1994	1990	0	0	0	0	0	8,510
1995	1990	0	0	0	95	95	9,750
1996	1990	0	0	0	0	0	8,744
1997	1990	0	0	0	0	0	10,001
1998	1990	0	0	0	0	0	9,222
1999	1990	0	0	0	95	95	9,249
2000	1990	0	0	0	0	0	5,622
2000	2000	0	0	0	0	0	7,361
2001	2000	0	0	0	0	0	4,508
2002	2000	0	0	0	0	0	3,995
2003	2000	0	0	0	0	0	3,591
2004[4]	2000	0	0	0	0	0	7,756
2005[4]	2000	0	0	0	0	0	5,772
2006[4]	2000	0	0	0	0	0	2,477
2007 (INMv6.2a)[4]	2000	0	0	0	0	0	9,441
2007 (INMv7.0)[4]	2000	0	0	0	0	0	9,770

Table H-6 Noise-Exposed Population by Community (Continued)

Year	Census Data	80+ dB DNL	75-80 dB DNL	70-75 dB DNL	65-70 dB DNL[1]	Total (65+)	60-65 dB DNL
EVERETT							
1990	1980	0	0	0	0	0	NA
1992	1980	0	0	0	0	0	NA
1993	1980	0	0	0	0	0	NA
1994	1990	0	0	0	0	0	0
1995	1990	0	0	0	0	0	0
1996	1990	0	0	0	0	0	0
1997	1990	0	0	0	0	0	0
1998	1990	0	0	0	0	0	0
1999[3]	1990	0	0	0	0	0	0
2000[3]	1990	0	0	0	0	0	0
2000[3]	2000	0	0	0	0	0	0
2001[3]	2000	0	0	0	0	0	0
2002[3]	2000	0	0	0	0	0	0
2003[3]	2000	0	0	0	0	0	0
2004[3,4]	2000	0	0	0	0	0	0
2005[3,4]	2000	0	0	0	0	0	0
2006[4]	2000	0	0	0	0	0	0
2007 (INMv6.2a) [4]	2000	0	0	0	0	0	0
2007 (INMv7.0) [4]	2000	0	0	0	0	0	0
MEDFORD							
1990	1980	0	0	0	0	0	NA
1992	1980	0	0	0	0	0	NA
1993	1980	0	0	0	0	0	NA
1994	1990	0	0	0	0	0	0
1995	1990	0	0	0	0	0	0
1996	1990	0	0	0	0	0	0
1997	1990	0	0	0	0	0	0
1998	1990	0	0	0	0	0	0
1999	1990	0	0	0	0	0	0
2000	1990	0	0	0	0	0	0
2000	2000	0	0	0	0	0	0
2001	2000	0	0	0	0	0	0
2002	2000	0	0	0	0	0	0
2003	2000	0	0	0	0	0	0
2004[4]	2000	0	0	0	0	0	0
2005[4]	2000	0	0	0	0	0	0
2006[4]	2000	0	0	0	0	0	0
2007 (INMv6.2a) [4]	2000	0	0	0	0	0	0
2007 (INMv7.0) [4]	2000	0	0	0	0	0	0

Table H-6 Noise-Exposed Population by Community (Continued)

Year	Census Data	80+ dB DNL	75-80 dB DNL	70-75 dB DNL	65-70 dB DNL[1]	Total (65+)	60-65 dB DNL
QUINCY							
1990	1980	0	0	0	0	0	NA
1992	1980	0	0	0	0	0	NA
1993	1980	0	0	0	0	0	NA
1994	1990	0	0	0	0	0	0
1995	1990	0	0	0	0	0	0
1996	1990	0	0	0	0	0	0
1997	1990	0	0	0	0	0	0
1998	1990	0	0	0	0	0	0
1999	1990	0	0	0	0	0	0
2000	1990	0	0	0	0	0	0
2000	2000	0	0	0	0	0	636
2001	2000	0	0	0	0	0	610
2002	2000	0	0	0	0	0	610
2003	2000	0	0	0	0	0	610
2004[4]	2000	0	0	0	0	0	610
2005[4]	2000	0	0	0	0	0	610
2006[4]	2000	0	0	0	0	0	610
2007 (INMv6.2a) [4]	2000	0	0	0	0	0	0
2007 (INMv7.0) [4]	2000	0	0	0	0	0	0
REVERE							
1990	1980	0	0	0	4,274	4,274	NA
1992	1980	0	0	0	3,848	3,848	NA
1993	1980	0	0	0	4,617	4,617	NA
1994	1990	0	0	0	3,569	3,569	2,099
1995	1990	0	0	0	3,364	3,364	2,304
1996	1990	0	0	172	3,292	3,464	2,505
1997	1990	0	0	0	3,293	3,293	2,047
1998	1990	0	0	0	3,168	3,168	2,132
1999	1990	0	0	128	3,165	3,293	2,047
2000	1990	0	0	0	2,552	2,552	2,386
2000	2000	0	0	0	2,496	2,496	3,100
2001	2000	0	0	0	2,496	2,496	3,100
2002	2000	0	0	0	2,822	2,822	2,399
2003	2000	0	0	0	2,994	2,994	2,227
2004[4]	2000	0	0	82	2,969	3,051	2,678
2005[4]	2000	0	0	82	2,540	2,622	2,731
2006[4]	2000	0	0	82	2,540	2,622	2,698
2007 (INMv6.2a) [4]	2000	0	0	0	2,457	2,457	2,846
2007 (INMv7.0) [4]	2000	0	0	0	2,450	2,450	2,853

Table H-6 Noise-Exposed Population by Community (Continued)

Year	Census Data	80+ dB DNL	75-80 dB DNL	70-75 dB DNL	65-70 dB DNL[1]	Total (65+)	60-65 dB DNL
WINTHROP							
1990	1980	0	676	1,211	2,420	4,307	NA
1992	1980	0	626	1,146	2,488	4,262	NA
1993	1980	0	648	1,211	1,773	3,632	NA
1994	1990	0	417	1,343	5,154	6,914	7,512
1995	1990	0	482	1,611	5,757	7,850	7,077
1996	1990	0	417	1,376	5,930	7,723	7,333
1997	1990	0	417	1,659	6,386	8,462	6,839
1998	1990	0	519	1,522	6,572	8,613	6,507
1999	1990	0	353	1,408	5,946	7,707	7,135
2000	1990	0	277	991	5,240	6,508	7,296
2000	2000	0	247	1,070	4,684	6,001	7,776
2001	2000	0	244	683	4,123	5,050	8,104
2002	2000	0	2	481	2,247	2,730	7,921
2003	2000	0	0	339	1,956	2,295	7,386
2004[4]	2000	0	2	337	1,649	1,988	6,508
2005[4]	2000	0	39	347	1,280	1,666	6,353
2006[4]	2000	0	39	416	1,288	1,743	6,845
2007 (INMv6.2a) [4]	2000	0	0	247	1,191	1,438	5,735
2007 (INMv7.0) [4]	2000	0	0	247	1,139	1,386	5,996
All Communities							
1990	1980	0	676	2,989	40,477	44,142	NA
1992	1980	0	628	2,352	14,604	17,584	NA
1993	1980	0	648	1,475	9,210	11,333	NA
1994	1990	0	523	1,608	16,421	18,552	49,016
1995	1990	0	588	2,462	18,031	21,081	52,896
1996	1990	0	523	1,922	17,997	20,442	59,574
1997	1990	0	523	2,378	23,536	26,437	73,691
1998	1990	0	577	2,102	20,617	23,296	70,062
1999	1990	0	411	1,900	20,838	23,149	64,379
2000	1990	0	335	1,174	15,672	17,181	47,778
2000	2000	0	247	1,304	16,194	17,745	54,190
2001	2000	0	244	998	13,004	14,246	43,616
2002	2000	0	2	613	7,694	8,309	38,150
2003	2000	0	0	503	6,680	7,183	35,577
2004[4]	2000	0	67	611	8,760	9,438	41,975
2005[4]	2000	0	104	533	5,840	6,477	33,127
2006[4]	2000	0	104	597	4,882	5,583	27,496
2007 (INMv6.2a) [4]	2000	0	0	416	7,761	8,177	38,134
2007 (INMv7.0) [4]	2000	0	0	416	7,175	7,591	38,052

Source: Data prepared for Massport by HMMH.
NA Not available.
1 65 dB DNL is the Federally-defined noise criterion.
2 Portions of Dorchester, East Boston, Roxbury, South Boston, and the South End are included in Boston totals.
3 Boston population by community changed in 1999 due to employment of more accurate hill effects methodology and reporting change.
4 All results since 2004 are from the RealContours™ modeling system.

Noise Complaints

Table H-7 presents a summary by community of the total complaints made in 2007 to Massport's Noise Complaint Line. The Noise Complaint Line provides individuals the ability to express their concerns about aviation noise (activities) or to ask questions regarding noise at Logan Airport. Callers ask a range of questions such as "Why is this runway in use?"; "What time do the planes stop flying?"; and "Was that aircraft off-course?"

The Noise Abatement Office (NAO) staff documents noise line complaints by obtaining information from the caller about the nature of the complaint, time of the occurrence, location of caller's residence, and the activity that was disturbed. The NAO uses the collected information to determine the probable activity responsible for the complaint and writes a letter report to the complainant. The letter includes the original complaint, a response that identifies the activity responsible for the call (arrivals, departures, run-up, etc.), meteorological information at the time of the call (a major factor in aviation activities), runways in use at the time of the call, and a notice that the FAA will receive a copy of the report.

In 2007, Massport received a total of 5,415 noise complaints from 64 communities, an increase of 36.9 percent from 2006, when the NAO received 3,955 complaints. Fifteen communities with more than 100 annual complaints had an increase in the number of calls from 2006. Massport's website, www.massport.com, provides for additional general questions and answers regarding the Noise Complaint Line.

Table H-7 Noise Complaint Line Summary

Town	2006 Calls	2006 Callers	2007 Calls	2007 Callers	Change Calls	Town	2006 Calls	2006 Callers	2007 Calls	2007 Callers	Change Calls
Arlington	2	2	13	8	11	Marshfield	2	5	144	50	142
Belmont	1	1	0	0	-1	Medford	31	2	93	35	62
Beverley	0	0	4	1	4	Medway	0	0	5	1	5
Beverly	0	0	0	0	0	Melrose	0	0	3	3	3
Billerica	0	0	1	1	1	Milton	110	27	148	39	38
Boston	38	24	40	30	2	Nahant	318	52	83	19	-235
Braintree	4	4	3	3	-1	Natick	1	14	1	1	0
Brighton	1	1	5	3	4	Needham	1	1	0	0	-1
Brookline	8	6	9	7	1	Newton	0	0	1	1	1
Burlington	0	0	0	0	0	Norwell	0	0	4	2	4
Cambridge	367	12	622	62	255	Peabody	4	1	8	5	4
Charlestown	4	3	22	10	18	Plymouth	1	3	0	0	-1
Chelsea	260	33	902	72	642	Quincy	11	7	23	9	12
Cohasset	4	4	20	12	16	Randolph	2	4	0	0	-2
Concord	11	1	0	0	-11	Revere	64	32	70	34	6
Danvers	0	0	13	2	13	Roslindale	33	14	10	4	-23
Dedham	4	2	0	0	-4	Roxbury	182	18	154	11	-28
Dorchester	17	12	12	11	-5	Salem	6	3	0	0	-6
Duxbury	0	0	3	3	3	Scitutate	3	1	0	0	-3
East Boston	75	36	235	97	160	Somerville	13	8	352	162	339
Easton	1	1	0	0	-1	South Boston	128	54	78	40	-50
Everett	98	25	128	28	30	South End	111	42	59	16	-52
Harvard	0	0	0	0	0	South Hamilton	0	0	1	1	1
Haverhill	0	0	0	0	0	Stoneham	1	2	0	0	-1
Hingham	242	14	102	12	-140	Stoughton	0	0	9	3	9
Holbrook	0	0	2	2	2	Sudbury	0	0	0	0	0
Hull	312	29	254	33	-58	Swampscott	9	2	7	2	-2
Hyde Park	12	4	21	2	9	Wakefield	2	2	0	0	-2
Ipswich	0	0	0	0	0	Watertown	0	0	11	6	11
Jamaica Plain	218	49	154	39	-64	West Roxbury	3	2	6	2	3
Lexington	642	1	153	1	-489	Weston	2	1	35	2	33
Lynn	0	0	30	8	30	Weymouth	242	1	255	7	13
Lynnfield	6	1	8	2	2	Winchester	3	3	0	0	-3
Malden	16	2	13	4	-3	Winthrop	324	160	363	167	39
Manchester	0	0	0	0	0	Woburn	5	2	711	4	706
Marblehead	0	0	12	5	12	Total	3,955	730	5,415	1,084	1,460

Source: Massport NAO.

Fleet Mix

As in the past, operations by aircraft types have been summarized into several key categories: commercial (passenger and cargo) operations, Stage 2 or Stage 3 jet aircraft, and turboprop and propeller (non-jet) aircraft. In addition, the operations are split into daytime and nighttime periods, where nighttime hours are defined as 10:00 PM to 7:00 AM, consistent with the definition of DNL. Table H-8 summarizes the numbers of operations by categories of aircraft operating at Logan Airport from 1990 through 2007. General aviation (GA) operations were not included in the noise modeling prior to 1998 and commercial jet operations were not separated until 1999.

Table H-8 Modeled Daily Operations by Commercial and General Aviation Aircraft[1] – 1990 to 2007

		1990	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Commercial Aircraft																		
Stage 2 Jets[2]	Day	312.40	228.89	203.34	189.40	156.90	132.40	108.46	84.93	83.30	5.13	1.18	0.05	0.08	0.03	0.05	0.03	0.03
	Night	19.99	13.13	7.44	10.10	5.50	4.79	7.75	5.92	6.66	0.26	0.05	0.00	0.00	0.01	0.01	0.00	0.01
	Totals	332.39	242.02	210.78	199.50	162.40	137.19	116.21	90.85	89.96	5.39	1.23	0.05	0.08	0.05	0.06	0.03	0.04
Stage 3 Jets (All)	Day	288.89	384.49	418.99	425.70	429.40	439.81	505.08	541.43	597.28	727.09	756.24	740.75	717.85	772.39	765.76	767.55	748.13
	Night	57.25	58.29	65.47	62.80	69.00	80.16	85.06	95.54	98.59	103.66	109.77	97.04	92.69	113.24	113.66	114.81	118.29
	Totals	346.14	442.78	484.46	488.50	498.40	519.97	590.14	636.97	695.87	830.75	866.01	837.79	810.54	885.63	879.42	882.36	866.42
Conventional Jets	Day	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	569.18	648.95	569.99	500.70	461.06	518.96	505.48	490.63	472.39
	Night	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	96.21	99.79	101.30	83.52	72.69	89.24	91.99	92.71	96.28
	Totals	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	665.39	748.74	671.29	584.22	533.75	608.20	597.47	583.34	568.66
Regional Jets	Day	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	28.10	78.14	186.25	240.05	256.80	253.43	260.34	276.95	275.77
	Night	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	2.38	3.87	8.47	13.52	19.99	24.00	21.68	22.11	22.03
	Totals	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	NA[3]	30.48	82.01	194.72	253.57	276.79	277.43	282.01	299.06	297.80
Non-Jet Aircraft	Day	444.41	411.84	598.16	541.97	526.85	505.31	514.70	552.56	448.82	409.62	317.62	165.45	135.18	133.24	148.77	140.81	145.27
	Night	11.72	69.32	46.84	13.59	11.14	13.73	27.27	21.86	16.63	21.58	10.97	3.45	2.41	3.03	3.02	3.26	3.47
	Total	456.13	481.16	645.00	555.56	537.99	519.04	541.97	574.42	465.45	431.20	328.58	168.89	137.59	136.28	151.79	144.07	148.73
Total Commercial Operations	Day	1045.70	1025.22	1220.49	1157.07	1113.15	1077.52	1128.24	1178.92	1129.90	1141.84	1075.04	906.25	853.10	905.66	914.59	908.41	893.43
	Night	88.96	140.74	119.75	86.49	85.64	98.68	120.08	123.32	121.88	125.51	120.79	100.49	95.10	116.29	116.68	118.09	121.77
	Total	1134.66	1165.96	1340.24	1243.56	1198.79	1176.20	1248.32	1302.24	1251.78	1267.35	1195.82	1006.73	948.20	1021.95	1031.27	1026.51	1015.19
GA Aircraft																		
Stage 2 Jets[2]	Day	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	5.25	9.89	7.29	5.15	3.65	2.84	0.94	2.29	1.90	1.24
	Night	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	0.40	0.74	0.64	0.50	0.41	0.26	0.14	0.25	0.17	0.19
	Total	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	5.65	10.63	7.93	5.65	4.08	3.10	1.08	2.54	2.07	1.43
Stage 3 Jets	Day	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	30.54	48.46	40.08	34.23	37.83	46.21	53.72	58.84	61.08	54.82
	Night	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	4.21	6.55	3.21	3.28	6.42	6.98	8.37	9.33	6.57	6.39
	Total	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	34.75	55.01	43.29	37.51	44.25	53.19	62.09	68.16	67.65	61.21
Non-Jets	Day	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	37.29	19.36	34.57	37.31	17.36	17.81	16.95	14.00	15.05	11.98
	Night	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	16.28	18.89	1.83	1.92	4.45	4.40	5.20	4.75	1.39	3.61
	Total	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	53.57	38.25	36.40	39.23	21.81	22.21	22.14	18.75	16.44	15.58
Total GA Operations	Day	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	73.08	77.71	81.94	76.68	58.84	66.88	71.60	75.12	78.03	68.04
	Night	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	20.89	26.17	5.68	5.71	11.29	11.64	13.71	14.33	8.13	10.19
	Total	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	NA[4]	93.97	103.88	87.62	82.39	70.13	78.52	85.31	89.46	86.15	78.22
Total	Day	1045.70	1025.22	1220.49	1157.07	1113.15	1077.52	1128.24	1252.00	1207.61	1223.78	1151.72	965.09	919.98	977.27	989.71	986.43	961.46
	Night	88.96	140.74	119.75	86.49	85.64	98.68	120.08	144.21	148.05	131.19	126.50	111.78	106.74	130.00	131.02	126.22	131.96
	Total[3]	1134.66	1165.96	1340.24	1243.56	1198.79	1176.20	1248.32	1396.21	1355.66	1354.97	1278.21	1076.86	1026.72	1107.26	1120.73	1112.66	1093.42

Source: Massport's Noise Monitoring System and Revenue Office numbers.
Note: Data from 1991 not available.
GA General Aviation
1 Includes scheduled and unscheduled operations.
2 Stage 2 aircraft are exempt from meeting newer federal Stage 3 noise limits when their maximum gross takeoff weight is less than or equal to 75,000 pounds.
3 Regional Jet operations were not tracked separately prior to 1999.
4 Totals prior to 1998 do not include GA operations.

Commercial Jet Aircraft by Part 36 Stage Category

Jet aircraft currently operating at Logan Airport are categorized by the FAA into two groups: Stage 2 and Stage 3. As described in *Chapter 6, Noise Abatement*, the designation refers to a noise classification specified in Federal Aviation Regulation (FAR) Part 36 that sets noise emission standards at three measurement locations – takeoff, landing, and sideline – based on an aircraft's maximum certificated weight. The heavier the aircraft, the more noise it is permitted to make within limits. Because of the substantial differences in noise between Stage 2, recertificated Stage 3, and new Stage 3 aircraft, Massport tracks operations by these separate categories to follow their trends. Table H-9 shows the percentage of commercial jet operations by stage category from 1999 though 2007. One of the most significant changes occurring after the economic downturn in 2001 was the almost immediate retirement of the recertificated aircraft from airlines' fleets due to their high operating costs.

Table H-9 Percentage of Commercial Jet Operations by Part 36 Stage Category – 1999 to 2007

	New Stage 3[1]	Recertificated Stage 3[2]	Stage 2	Total
1999	70.0%	21.0%	9.0%	100%
2000	75.0%	24.0%	1.0%	100%
2001	86.3%	13.6%	0.1%	100%
2002	92.8%	7.2%	0.0%	100%
2003	95.8%	4.1%	0.01%	100%
2004	97.8%	2.2%	0.0%	100%
2005	98.0%	2.0%	0.0%	100%
2006	98.6%	1.4%	0.0%	100%
2007	98.3%	1.7%	0.0%	100%

Source: Massport and FAA radar data.
1 New Stage 3 aircraft are aircraft originally manufactured as a certified Stage 3 aircraft under Federal Regulation Part 36.
2 Recertificated Stage 3 aircraft are aircraft originally manufactured as a certified Stage 1 or 2 aircraft under Federal Regulation Part 36 which have been either treated with hushkits or have been re-engined to meet Stage 3 requirements.

Nighttime Operations

Massport tracks flights that operate between the broader DNL nighttime period of 10:00 PM to 7:00 AM, when each flight is penalized 10 dB in calculations of noise exposure. Table H-10 shows this nighttime activity by different groups of aircraft. Nighttime flights by commercial operators (jet and non-jet) have experienced a small increase at Logan Airport over the past three years. The majority of nighttime operations (between 10:00 PM and 7:00 AM) occurred either before midnight or after 5:00 AM.

Table H-10 Modeled Nighttime Operations at Logan Airport – 1990 to 2007

	Commercial Jets	Commercial Non-Jets	General Aviation[1]	Total
1990	77.24	11.72	NA	88.96
1991	NA[2]	NA[2]	NA[2]	NA[2]
1992	71.42	69.32	NA	140.74
1993	72.91	46.84	NA	119.75
1994	72.90	13.59	NA	86.49
1995	74.50	11.14	NA	85.64
1996	84.95	13.73	NA	98.68
1997	92.81	27.27	NA	120.08
1998	101.46	21.86	NA	123.32
1999	105.25	16.63	26.17	148.05
2000	103.92	21.58	5.68	131.19
2001	109.82	10.97	5.71	126.50
2002	97.04	3.45	11.29	111.78
2003	92.69	2.41	11.64	106.74
2004	113.26	3.03	13.71	130.00
2005	113.67	3.02	14.33	131.02
2006	114.83	3.26	8.13	126.22
2007	118.30	3.47	10.19	131.96
Change (2006 to 2007)	3.47	0.21	2.06	5.74
Percent Change	3.0%	6.4%	25.3%	4.5%

1 General aviation data not available prior to 1999.
2 1991 data not available.

Jet Runway Use

Table H-11 presents a summary of runway use by jets. Since 2001, the radar data have been analyzed with Massport's PreFlight™ software. PreFlight™ is an analysis package used to compile fleet, day/night splits, and runway use information from radar data. Data prior to 2001 were derived from Massport's original noise monitoring system, supplemented with field records. Table H-11 is data for jets only which is why there are no arrivals to Runway 22R and no departures from Runway 4L as Logan Noise rules prevent the use of jets on these runway ends.

Table H-11 Summary of Jet Aircraft Runway Use – 1990 to 2007

	Runway									
	4L	4R	9	14[1]	15R	22L	22R	27	32[1]	33L
1990										
Departures	0%[2]	3%	21%	NA	10%	2%	36%	20%	NA	7%
Arrivals	1%	25%	0%	NA	2%	14%	0%	28%	NA	29%
1992[2]										
Departures	0%	6%	31%	NA	7%	2%	38%	10%	NA	6%
Arrivals	1%	37%	0%	NA	3%	12%	0%	30%	NA	17%
1993										
Departures	0%	9%	33%	NA	7%	3%	40%	4%	NA	4%
Arrivals	2%	44%	0%	NA	1%	11%	0%	28%	NA	15%
1994										
Departures	0%	9%	33%	NA	4%	3%	32%	12%	NA	5%
Arrivals	3%	42%	0%	NA	1%	8%	0%	27%	NA	19%
1995										
Departures	0%	8%	36%	NA	5%	5%	29%	11%	NA	5%
Arrivals	3%	41%	0%	NA	2%	8%	0%	27%	NA	17%
1996										
Departures	0%	8%	32%	NA	5%	6%	33%	12%	NA	5%
Arrivals	2%	38%	0%	NA	2%	11%	0%	29%	NA	18%
1997										
Departures	0%	8%	30%	NA	5%	6%	31%	15%	NA	5%
Arrivals	2%	36%	0%	NA	2%	9%	0%	30%	NA	20%
1998										
Departures	0%	8%	35%	NA	6%	5%	28%	14%	NA	5%
Arrivals	2%	41%	0%	NA	2%	7%	0%	28%	NA	19%
1999										
Departures	0%	8%	31%	NA	5%	4%	30%	15%	NA	6%
Arrivals	3%	37%	0%	NA	2%	10%	0%	28%	NA	21%
2000										
Departures	0%	8%	35%	NA	4%	3%	30%	15%	NA	6%
Arrivals	4%	50%	0%	NA	1%	7%	0%	28%	NA	20%

Table H-11 Summary of Jet Aircraft Runway Use (Continued)

	Runway									
	4L	4R	9	14[1]	15R	22L	22R	27	32[1]	33L
2001										
Departures	0%	7%	34%	NA	4%	3%	35%	12%	NA	5%
Arrivals	5%	36%	0%	NA	1%	8%	0%	32%	NA	18%
2002										
Departures	0%	4%	31%	NA	6%	3%	35%	16%	NA	6%
Arrivals	6%	31%	0%	NA	1%	12%	0%	30%	NA	21%
2003										
Departures	0%	4%	33%	NA	7%	2%	34%	14%	NA	6%
Arrivals	7%	33%	0%	NA	1%	14%	0%	28%	NA	18%
2004										
Departures	0%	5%	34%	NA	10%	4%	24%	18%	NA	6%
Arrivals	6%	34%	0%	NA	1%	12%	0%	24%	NA	23%
2005										
Departures	0%	5%	36%	NA	7%	1%	31%	13%	NA	7%
Arrivals	8%	33%	0%	NA	1%	11%	0%	29%	0%	17%
2006										
Departures	0%	4%	33%	0%	3%	1%	40%	13%	-	6%
Arrivals	7%	29%	0%	-	1%	14%	0%	33%	0.2%	16%
2007										
Departures	0%	5%	31%	0%	4%	1%	33%	7%	-	19%
Arrivals	5%	31%	0%	-	1%	15%	0%	36%	2%	11%

Source: Massport Noise Office.

Notes: The data reflect actual percentages of jet aircraft operations on each runway end. They should not be confused with effective runway use which is used by the PRAS to derive recommendations for use of a particular runway. Effective runway percentages include a factor of 10 applied to nighttime operations so that use of a runway at night more closely reflects its effect on total noise exposure.
Jet aircraft are not able to use Runway 15L or 33R due to its length of only 2,557 feet.
Values may not add to 100 percent due to rounding.

1 Runway 14-32 opened in late November, 2006. (Runway 14-32 is unidirectional with no arrivals to Runway 14 and no departures from Runway 32).

2 1991 data are not available. The *1990 Final Generic Environmental Impact Report* was published and submitted to the Secretary of Environmental Affairs in July 1993. It included modeled operations and resulting noise contours for 1987, 1990, and a 1996 forecast year. The *1993 Annual Update* published in July 1994 included operations and contours for 1992 and 1993. 1991 data are not available.

NA Runway was not available.

Cumulative Noise Index (CNI)

Massport reports total annual fleet noise at Logan Airport, defined in the Logan Airport Noise Rules by a metric referred to as the CNI. The CNI is a single number representing the sum of the entire set of single-event noise levels experienced at the Airport over a full year of operation, weighted similarly to DNL so that activity occurring at night is penalized by adding an extra 10 dB to each event. This penalty is mathematically equivalent to multiplying the number of nighttime events by each aircraft by a factor of 10. The Logan Airport Noise Rules define CNI in terms of EPNdB and require that the index be computed for the fleet of commercial aircraft operating at Logan Airport throughout the year. In addition, in EDRs and ESPRs, Massport reports partial CNI values of noise at Logan Airport, so that various subsets of the fleet (cargo, night operations, passenger jets, etc.) are identified.

The Noise Rules, adopted by Massport following public hearings held in February 1986, established a CNI limit of 156.5 EPNdB. The CNI generally has decreased since 1990, remaining below that cap, with changes from year to year on the order of a few tenths of a dB. The 2007 CNI remains well below the cap of 156.5 EPNdB.

Table H-12 Cumulative Noise Index (EPNdB) – 1990 to 2007

Logan Airport CNI Cap – 156.5 EPNdB

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Change from 2006
Full CNI (Entire Commercial Jet Fleet)	156.4	155.8	155.5	155.3	155.4	155.3	155.1	154.8	154.7	154.9	154.7	154.1	153.2	152.7	153.4	153.2	152.6	152.7	0.1
Total Passenger Jets	155.2	154.8	154.6	154.4	154.4	154.2	154.1	153.9	153.7	153.9	153.6	152.9	151.8	151.3	152.2	152.1	151.4	151.5	0.1
Total Cargo Jets	150.1	148.9	148.0	147.9	148.3	148.8	148.6	147.5	147.9	148.0	148.2	147.8	147.4	147.1	147.0	146.6	146.5	146.4	(0.1)
Total Daytime	152.5	152.1	152.4	152.1	152.1	151.6	151.2	150.8	150.4	150.4	149.5	149.0	148.5	148.0	148.5	148.2	147.5	147.2	(0.3)
Total Nighttime	154.4	153.4	152.6	152.4	152.6	152.9	152.9	152.5	152.7	153.1	153.1	152.4	151.3	150.9	151.7	151.6	151.0	151.2	0.2
Total Stage 2 Jets	NA	NA	NA	NA	151.0	150.2	149.4	149.2	147.7	147.1	124.7	121.5	114.3	114.1	118.1	NA	NA	NA	NA
Total Stage 3 Jets	NA	NA	NA	NA	153.4	153.8	153.8	153.4	153.8	154.2	154.7	154.1	153.2	152.7	153.4	153.2	152.6	152.7	0.1
Daytime Stage 2	NA	NA	NA	NA	149.0	148.5	147.6	146.5	145.2	144.1	122.6	119.3	111.2	113.7	109.4	NA	NA	NA	NA
Nighttime Stage 2	NA	NA	NA	NA	146.7	145.1	144.8	145.8	144.1	144.0	120.5	117.3	111.4	103.2	117.5	NA	NA	NA	NA
Daytime Stage 3	NA	NA	NA	NA	149.1	148.8	148.7	148.8	148.9	149.2	149.5	149.0	148.5	148.0	148.5	148.2	147.5	147.2	(0.3)
Nighttime Stage 3	NA	NA	NA	NA	151.4	152.1	152.2	151.5	152.1	152.5	153.1	152.4	151.3	150.9	151.7	151.6	151.0	151.2	0.2
Passenger Jet Stage 2	NA	NA	NA	NA	150.5	149.9	149.2	148.9	147.5	146.8	124.2	116.3	NA	NA	NA	NA	NA	NA	NA
Passenger Jet Stage 3	NA	NA	NA	NA	152.2	152.3	152.3	152.2	152.6	153.0	153.6	152.9	151.8	151.3	152.2	152.1	151.4	151.5	0.1
Cargo Jet Stage 2	NA	NA	NA	NA	141.5	137.4	136.8	137.4	139.0	134.5	114.8	119.9	114.3	114.1	118.1	NA	NA	NA	NA
Cargo Jet Stage 3	NA	NA	NA	NA	147.3	148.5	148.3	147.0	147.3	147.9	148.2	147.8	147.4	147.1	147.0	146.6	146.5	146.4	(0.1)
Daytime Passenger	NA	152.0	152.2	152.0	152.0	151.5	151.1	150.6	150.1	150.1	149.3	148.7	148.2	147.7	148.2	147.9	147.2	146.9	(0.3)
Nighttime Passenger	NA	151.6	150.9	150.6	150.8	151.0	151.0	151.1	151.2	151.6	151.6	150.8	149.4	148.8	150.0	150.1	149.3	149.7	0.4
Daytime Cargo	137.1	137.1	137.6	135.2	136.1	138.0	136.7	136.2	138.0	138.2	137.5	137.1	137.0	136.2	135.7	135.8	135.5	135.8	0.3
Nighttime Cargo	149.9	148.6	147.6	147.6	148.0	148.4	148.3	147.1	147.5	147.6	147.8	147.4	147.0	146.8	146.7	146.2	146.1	146.0	(0.1)
Daytime Passenger Stage 2	NA	NA	NA	NA	148.9	148.4	147.6	146.5	145.0	143.9	122.3	115.0	NA	NA	NA	NA	NA	NA	NA
Daytime Passenger Stage 3	NA	NA	NA	NA	149.0	148.5	148.4	148.5	148.6	149.0	149.2	148.7	148.2	147.7	148.2	147.9	147.2	146.9	(0.3)
Nighttime Passenger Stage 2	NA	NA	NA	NA	149.0	148.5	148.4	148.5	142.8	143.7	119.8	110.2	NA	NA	NA	NA	NA	NA	NA
Nighttime Passenger Stage 3	NA	NA	NA	NA	149.4	149.9	150.1	149.8	150.5	150.8	151.6	150.8	149.4	148.8	150.0	150.1	149.3	149.7	0.4
Daytime Cargo Stage 2	NA	NA	NA	NA	128.3	126.7	124.6	126.4	131.6	131.5	111.1	117.3	111.2	113.7	109.4	NA	NA	NA	NA
Daytime Cargo Stage 3	NA	NA	NA	NA	135.3	137.7	136.4	135.7	136.9	137.1	137.5	137.0	137.0	136.1	135.7	135.8	135.5	135.8	0.3
Nighttime Cargo Stage 2	NA	NA	NA	NA	141.3	137.0	136.5	137.0	138.2	131.5	112.3	116.4	111.4	103.2	117.5	NA	NA	NA	NA
Nighttime Cargo Stage 3	NA	NA	NA	NA	147.0	148.1	148.0	146.6	146.9	147.5	147.8	147.4	147.0	146.8	146.7	146.2	146.1	146.0	(0.1)

Notes: General aviation and non-jet aircraft are not included in the calculation.
No operations by this aircraft type in the commercial fleet.

Flight Track Monitoring Report

Introduction

As part of its ongoing commitment to mitigate noise at Logan Airport, Massport has undertaken evaluating the flight tracks of turbojet aircraft engaged in the implementation of established FAA noise abatement procedures. As is true for any airport operator, however, Massport has no authority to control where individual aircraft actually fly. That remains the responsibility of the FAA, while the individual pilots are responsible for safely executing the FAA's instructions. The flight procedures, which are used by the Air Traffic Control (ATC) staff at Boston Tower to achieve desired noise abatement tracks, are contained in the FAA's Tower Order BOS TWR 7040.1.

This is the sixth annual report for Flight track monitoring; prior to 2002 Massport had issued semi-annual reports, an outgrowth of the Flight Track Monitoring Program study. That study was contained in the *Generic Environmental Impact Report* filed with Massachusetts Environmental Policy Act (MEPA) in July of 1996, and was the subject of two Community Working Group (CWG) workshops in September and October of 1996. The time period covered by this report is January 1 through December 31, 2006. Massport's consultants prepared the work.

The purpose of the ongoing monitoring program is to identify any systematic changes in flight tracks that may occur and to reduce flight track dispersion, where appropriate. The next report will cover the period January 1, 2008 through December 31, 2008, and will be included in the *2008 EDR*.

FAA Air Traffic Control Procedures

FAA Tower Order BOS TWR 7040.1 entitled "Noise Abatement" describes the series of noise abatement policies, rules, regulations, and the procedures to be followed by the FAA air traffic controllers in meeting their designated responsibilities to be "a good neighbor and to meet ... operational objectives within the context of mitigating noise whenever circumstances permit." Section 8(e) of the Order, subtitled "Turbojet Departure and Arrival Noise Abatement Procedures" lists the specific procedures that apply to each major departure runway. They are paraphrased below.

Note in the descriptions that follow that terms such as "BOS 2 DME" are used frequently. Here, BOS refers to an aid to navigation known as the BOSTON VORTAC, a radio beacon physically located on the Airport near the eastern shoreline between the ends of Runways 27 and 33L. DME refers to "Distance Measuring Equipment," a co-located aid to navigation that provides pilots with a cockpit display of the number of nautical miles that the aircraft is from the designated radio beacon. Thus, BOS 2 DME means an aircraft should be 2 nautical miles away from the BOSTON VORTAC. The term "vectored" means the pilot is assigned to fly a magnetic heading given by and at the discretion of the FAA air traffic controller in order to maintain the safe separation of aircraft. "MSL" means feet above mean sea level--the indicator of aircraft altitude used both by the pilot in the cockpit and the air traffic controller on the ground.

- For departures from Runway 4R, the noise abatement procedure in the Tower Order is: Fly runway heading until the BOS 4 DME, then a heading of 090 degrees until clear of Nahant, then southbound. The departure may be vectored westbound to pass north of Hull and above 6,000 MSL by Deer Island. Otherwise, the departures shall be vectored south to cross the shoreline westbound, south of the Hull peninsula, in the vicinity of the 10-mile range mark above 6,000 MSL. Traffic that is vectored northbound shall cross the shoreline at or above 6,000 MSL in the vicinity of Marblehead Harbor.

- For Runway 9, the procedure is: Fly runway heading until at least the BOS 2 DME before turning. The westbound traffic shall be south of the Hull peninsula in the vicinity of the 10-mile range mark and cross the shoreline above 6,000 MSL. Traffic that is vectored northbound must cross the shoreline at or above 6,000 MSL in the vicinity of Marblehead Harbor.

- For Runway 15R, the procedure is: Fly runway heading to the BOS 1 DME then turn left to 120 degrees. North and south shoreline crossings shall be the same as for Runway 9 [that is, at or above 6,000 MSL].

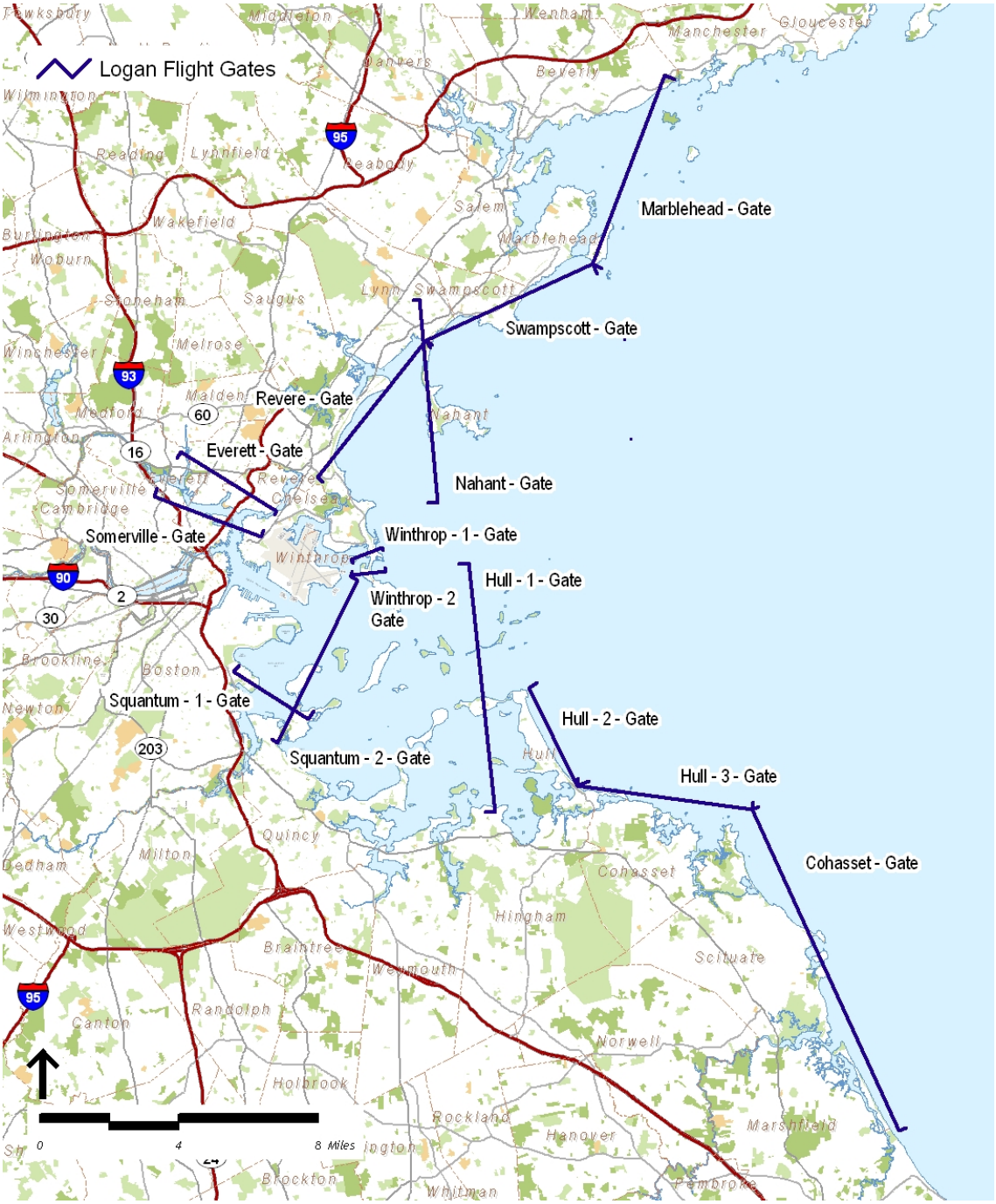
- For Runway 22R: Turn left to a heading of 140 degrees; upon radar identification, Departure Control [an FAA air traffic control position] will continue the turn east to pass north of the Hull peninsula. The north and south shoreline crossings shall be the same as for Runway 9. [Departures from Runway 22L, occurring far less often than those from Runway 22R, follow this same procedure although the Tower Order does not specify instructions for Runway 22L per se].

- For Runway 27:
  - Logan TWO SID: Fly heading 273 until BOS 2.2 DME, then turn left heading 235 degrees until BOS 6 DME, then on course.
  - WYLLY RNAV (for turbojet aircraft only). Fly heading 273 and turn to 235 over the GARVE waypoint. Stay on this course until over the WYLLY waypoint. This procedure keeps most jet traffic in a well defined flight corridor.

- For Runway 33L: Maintain runway heading to the BOS 2 DME, then turn left heading 316 degrees until leaving 3,000 feet [MSL] or reaching the BOS 5 DME.

These brief procedural statements form the basis of the verbal instructions and flight clearances that are passed from controller to pilot in order to achieve reduced noise in the communities surrounding Logan while also maintaining the safe and efficient flow of aircraft in and out of the Airport. However, the consistency with which these procedures can be implemented varies due to air traffic demands, controller workloads, weather conditions, and other operational factors, as noted in the Flight Track Monitoring Program Study.

Figure H-4 Logan Airport Gates



Statistical Analyses of Flight Tracks - Runway 4R

The Nahant Gate (Figure H-4) monitors aircraft after the first turn at 4 DME. The Swampscott and Marblehead Gates monitor northbound shoreline crossings, while the Hull 2, Hull 3, and Cohasset Gates monitor southbound shoreline crossings.

Table H-13 shows the dispersion of the jet departures on Runway 4R as they pass through the Nahant Gate. Table H-14 shows that Runway 4R departures were concentrated, with 88.8 percent "over the Causeway," and about 0.6 percent in the south end of the gate. Table H-14 shows how many of the shoreline crossings from Runway 4R were above 6,000 feet. Approximately 56.0 percent of departures were above 6,000 feet at Swampscott.

Table H-13 Runways 4R/4L Nahant Gate Summary for 2007

	Number of Tracks Through Gate Segment	Total Number of Tracks Through Gate	Percentage of Tracks Through Gate Segment
North End of Gate	815	7,649	10.7%
Over Causeway	6,789	7,649	88.8%
South End of Gate	45	7,649	0.6%
Total	7,649	7,649	100.0%

Table H-14 Runways 4R/4L Shoreline Crossings Above 6,000 Feet for 2007

	Number of Tracks Through Gate	Number Above 6,000 ft	Percentage Above 6,000 ft
Swampscott Gate	831	465	56.0%
Marblehead Gate	1,529	1,509	98.7%
Hull 2 Gate	621	621	100.0%
Hull 3 Gate	1,140	1,138	99.8%
Cohasset Gate	373	373	100.0%
Total	4,494	4,106	91.4%

Statistical Analyses of Flight Tracks - Runway 9

The Winthrop 1 and Winthrop 2 gates (Figure H-4) monitor early turns for Departures off Runway 9. The Revere, Swampscott, or Marblehead gates monitor northbound shoreline crossings, while the Hull 2, Hull 3, or Cohasset gates monitor southbound shoreline crossings.

Table H-15 shows how many tracks turned prior to the BOS 2 DME. Northbound turns before BOS 2 DME pass through the Winthrop 1 Gate. Southbound traffic would pass through the Winthrop 2 Gate. In 2007, there were a total of 169 such turns, or about 0.3 percent. Table H-16 indicates that 97.8 percent of Runway 9 departures were above 6,000 feet when crossing the shoreline, as compared with 97.9 percent in 2006.

Table H-15 Runway 9 Gate Summary – Winthrop Gates 1 and 2 for 2007			
	Number of Departure Tracks	Number of Tracks Through Gate	Percent Turning Before BOS 2 DME
Winthrop 1 Gate	48,954	42	0.1%
Winthrop 2 Gate	48,954	169	0.3%
Total	48,954	211	0.4%

Table H-16 Runway 9 Shoreline Crossings Above 6,000 Feet for 2007			
	Number of Tracks Through Gate	Number Above 6,000 ft	Percentage Above 6,000 ft
Revere Gate	98	86	87.8%
Swampscott Gate	4,611	4,419	95.8%
Marblehead Gate	6,641	6,574	99.0%
Hull 2 Gate	5,507	5,392	97.9%
Hull 3 Gate	21,834	21,286	97.5%
Cohasset Gate	4,165	4,144	99.5%
Total	42,856	41,901	97.8%

Statistical Analyses of Flight Tracks - Runway 15R

After takeoff, Runway 15R departures turn left approximately 30 degrees to avoid Hull, head out over Boston Harbor, and return back over the shore through the Swampscott and Marblehead Gates (Figure H-4) to the north, or through the Hull 2, Hull 3, and Cohasset Gates to the south.

Table H-17 shows that 95.3 percent of all Runway 15R departures crossed the shoreline above 6,000 feet.

Table H-17 Runway 15R Shoreline Crossings Above 6,000 Feet for 2007			
	Number of Tracks Through Gate	Number Above 6,000 ft	Percentage Above 6,000 ft
Swampscott Gate	810	805	99.4%
Marblehead Gate	764	761	99.6%
Hull 2 Gate	334	317	94.9%
Hull 3 Gate	2,438	2,243	92.0%
Cohasset Gate	663	648	97.7%
Total	5,009	4,774	95.3%

Statistical Analyses of Flight Tracks - Runways 22R/22L

The Squantum 2 and Hull 1 Gates (Figure 1) are used to monitor the turn to 140 degrees over Boston Harbor and north of Hull. The shoreline gates are used to monitor shoreline crossings, as for Runways 4R, 9, and 15R above.

Table H-189 shows the dispersion of the jet departures from Runways 22R-22L as they pass through the Squantum 2 Gate. Table H-19 shows that 96.7 percent of the tracks were north of the Hull peninsula as they passed through the Hull 1 Gate. Table H-20 shows that 98.3 percent of the shoreline crossings from Runways 22R-22L were above 6,000 feet in 2007.

Table H-18 Runways 22R/22L Squantum 2 Gate Summary for 2007

	Number of Tracks Through Gate Segment	Total Number of Tracks Through Gate	Percentage of Tracks Through Gate Segment
0 - 12,000 ft	30,708	43,988	69.8%
12,000 - 14,000 ft	8,867	43,988	20.2%
14,000 - 21,000 ft	4,334	43,988	9.9%
21,000 - 27,000 ft	79	43,988	0.2%
Total	43,988	43,988	100.0%

Table H-19 Runways 15R/22R/22L Gate Summary – North of Hull Peninsula for 2007

	Number of Tracks Through Gate	Number of Tracks North of Hull Peninsula	Percentage of Tracks North of Hull Peninsula
Hull 1 Gate	59,307	57,347	96.7%

Table H-20 Runways 22R/22L Shoreline Crossings Above 6,000 Feet for 2007

	Number of Tracks Through Gate	Number Above 6,000 ft	Percentage Above 6,000 ft
Revere Gate	1,123	1,110	98.8%
Swampscott Gate	8,287	8,250	99.6%
Marblehead Gate	3,251	3,228	99.3%
Hull 2 Gate	2,721	2,606	95.8%
Hull 3 Gate	25,220	24,654	97.8%
Cohasset Gate	4,110	4,095	99.6%
Total	44,712	43,943	98.3%

Runway 27

On September 15, 1996, the FAA implemented a new departure procedure for Runway 27 called the WYLYY RNAV procedure. In accordance with the provisions of the Record of Decision issued for the Runway 27 EIS, Massport has been providing on-going radar flight track data and analysis to the FAA with respect to the new procedure. Table H-21 presents the results for the Runway 27 corridor complied for 2007. The average percentage of tracks through the corridor was 52.8 percent.

Table H-21 Runway 27 Corridor Percent of Tracks Through Each Gate for 2007

Month	Total # of Tracks	Total # of Tracks Through All Gates	Percent of Tracks Through All Gates	Gate A 1,400 ft[1]	Gate B 2,200 ft[1]	Gate C 2,900 ft[1]	Gate D 4,700 ft[1]	Gate E 6,300 ft[1]	Average Percent Through Each Gate
January	2,061	1,130	54.8%	68.4%	75.1%	85.3%	91.3%	87.6%	81.5%
February	1,153	630	54.6%	67.6%	75.8%	84.0%	90.7%	85.9%	80.8%
March	479	219	45.7%	61.0%	69.5%	77.9%	83.5%	75.8%	73.5%
April	1,034	579	56.0%	75.2%	86.8%	93.0%	89.3%	25.4%	73.9%
May	631	322	51.0%	59.1%	69.3%	84.3%	92.7%	90.5%	79.2%
June	430	238	55.3%	65.6%	73.5%	82.6%	88.8%	86.7%	79.4%
July	574	288	50.2%	58.2%	65.3%	79.6%	88.7%	87.5%	75.9%
August	819	439	53.6%	62.6%	70.1%	86.2%	92.4%	89.5%	80.2%
September	1,214	654	53.9%	64.1%	71.1%	87.0%	93.7%	90.4%	81.3%
October	594	318	53.5%	62.6%	71.5%	81.3%	91.9%	88.4%	79.2%
November	584	290	49.7%	62.5%	72.4%	86.3%	91.4%	84.4%	79.4%
December	1,191	577	48.4%	64.4%	72.3%	83.9%	88.7%	81.1%	78.1%
Average	897	474	52.8%	64.3%	72.7%	84.3%	90.3%	81.1%	78.5%

1 Width of Each Gate in Feet.

Statistical Analyses of Flight Tracks - Runway 33L

The Somerville and Everett Gates (Figure H-4) extend from BOS 2 DME to BOS 5 DME and are used to monitor the departure procedure for Runway 33L. Turns to the left prior to the BOS 5 DME would pass through the Somerville Gate. Turns to the right prior to the BOS 5 DME would pass through the Everett Gate. Table H-22 shows the results of the analyses. The table indicates that in 2007 6.4 percent of tracks turned prior to either achieving 3,000 feet or reaching the BOS 5 DME. In 2006, 6.8 percent of tracks turned early before reaching 3,000 feet.

Table H-22 Runway 33L Gates – Passages Below 3,000 Feet for 2007

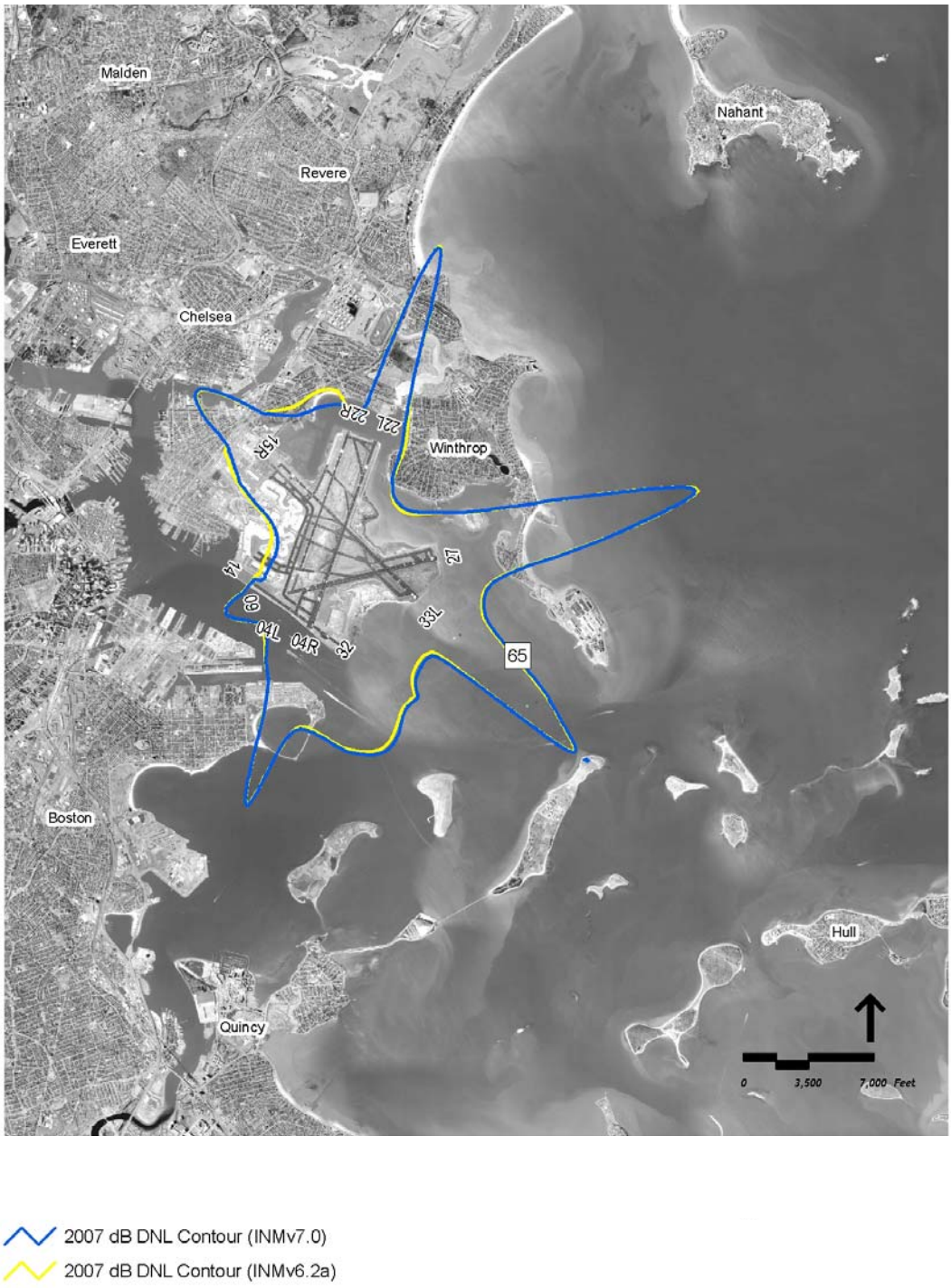
	Number of Departure Tracks	Number of Tracks Turning Before BOS 5 DME Below 3,000 ft	Percentage of Tracks Turning Before BOS 5 DME Below 3,000 ft
Everett Gate	29,498	725.00	2.46%
Somerville Gate	29,498	1,158.00	3.93%
Total	29,498	1,883.00	6.38%

INMv7.0 Contour Improvements

To demonstrate the improvement with upgrading to INMv7.0 for the 2007 contours, Figure H-5 compares the 65 dB DNL 2007 contour created with INMv7.0 to that created with INMv6.2a. As the figure shows, there is a high degree of correlation, however enhancements including the implementation of new thrust reverser algorithms, new flight path segmentation algorithms and an updated aircraft database as well as a new lateral attenuation adjustment model accounting for engine shielding during banked turns, have improved the accuracy of INMv7.0. The most pronounced change between the contours occurs to the north west of the airport due to changes in the algorithms used for start of takeoff roll.

An additional improvement over the contours reported in the 2006 EDR was the removal of a 5dB arrival correction for aircraft below 100 feet used in previous years. Through improvements to the most recent aircraft database in INM it was concluded that the original FAA approved arrival correction was no longer required. The contours in Figure H-5 for both INMv6.2a and INMv7.0 do not include the arrival correction and provide a direct comparison of the technical model improvements with INMv7.0.

Figure H-5 Comparison of the 65 dB DNL Contours for 2007 Operations Using INMv6.2a and INMv7.0



Air Quality/ Emissions Reduction

This appendix provides the following detailed information and tables in support of *Chapter 7, Air Quality/ Emissions Reduction*:

- 2007 Aircraft Fleet and Operational Data Used in EDMS v5.0.2
  - Table I-1 – 2007 Fleet Mix, Annual Landing-and-Takeoff Cycles (LTOs), and Taxi/Idle Time-in-Mode by Aircraft Type

- Ground Service Equipment/Alternative Fuels Conversion
  - Table I-2 – Ground Service Equipment Alternative Fuel Conversion Summary (kg/day)

- Motor Vehicle Emissions
  - Table I-3 – MOBILE6.2.03 Input Files
  - Table I-4 – MOBILE6.2.03 Output Files

- Fuel Storage and Handling
  - Table I-5 – Fuel Throughput by Fuel Category (gallons)

- Stationary Sources
  - Table I-6 – Stationary Source Fuel Throughput by Fuel Category (gallons)

- 1993 – 2003 Emissions Inventories
  - Table I-7 – Estimated VOC Emissions (in kg/day) at Logan Airport
  - Table I-8 – Estimated NO_X Emissions (in kg/day) at Logan Airport
  - Table I-9 – Estimated CO Emissions (in kg/day) at Logan Airport

- Greenhouse Gas Emissions Inventory
  - Table I-10 – Logan GHG Inventory Input Data & Information
  - Table I-11 – GHG Emission Factors
  - Table I-12 – GHG Emissions
  - Table I-13 – Logan Airport GHG Emissions Compared to Massachusetts Totals

2007 Aircraft Fleet and Operational Data used in EDMS Version 5.0.2

The Federal Aviation Administration (FAA) Emissions Dispersion System (EDMS), is the United States (U.S.) Environmental Protection Agency (EPA)-preferred and the FAA-required model for conducting airport air quality analyses. The most recent version of EDMS, Version 5.0.2 (EDMS v5.0.2), was used in support of the *2007 Environmental Data Report (2007 EDR)* Air Quality Analysis. Table I-1 contains the data that was used in EDMS v5.0.2 to represent actual conditions at Logan Airport in 2007. This data includes aircraft type, engine, landing takeoff cycles (LTOs) and taxi times. The aircraft are divided into four categories: air carrier, cargo, commuter, and general aviation (GA).

Table I-1 2007 Fleet Mix, Annual Landing-and-Takeoff Cycles (LTOs), and Taxi/Idle Time-in-Mode by Aircraft Type

Aircraft Type	Engine	LTOs	Description (Airline)	Taxi Times
Air Carrier Aircraft				
Airbus A300B4-600 Series	CF6-80C2A5 1862M39	2	AC AAL	26.79
Airbus A310-200 Series	CF6-80A3	197	AC SATA	26.79
Airbus A319-100 Series	CFM56-5A4	25	AC ACA	26.79
Airbus A319-100 Series	CFM56-5B6/P	2	AC FFT	26.79
Airbus A319-100 Series	CFM56-5B6/P	489	AC NWA	26.79
Airbus A319-100 Series	CFM56-5B6/P	898	AC Spirit	26.79
Airbus A319-100 Series	CFM56-5B6/P	2	AC Twin Jet	26.79
Airbus A319-100 Series	CFM56-5B6/P	11,955	AC USA	26.79
Airbus A319-100 Series	V2522-A5	630	AC AWE	26.79
Airbus A319-100 Series	V2522-A5	1,807	AC UAL	26.79
Airbus A320-200 Series	CFM56-5-A1	28	AC ACA	26.79
Airbus A320-200 Series	CFM56-5-A1	1,483	AC NWA	26.79
Airbus A320-200 Series	CFM56-5B4/P	1,082	AC USA	26.79
Airbus A320-200 Series	V2527-A5	807	AC AWE	26.79
Airbus A320-200 Series	V2527-A5	10,098	AC JBU	26.79
Airbus A320-200 Series	V2527-A5	1,432	AC UAL	26.79
Airbus A320-200 Series	V2527-A5	10	AC USA 3000	26.79
Airbus A321-100 Series	CFM56-5B3/P	265	AC USA	26.79
Airbus A330-200 Series	CF6-80E1A2 1862M39	175	AC EIN	26.79
Airbus A330-200 Series	CF6-80E1A3 Standard	1	AC AFR	26.79
Airbus A330-200 Series	PW4168 Talon II	345	AC SWR	26.79
Airbus A330-200 Series	PW4168 Talon II	2	AC USA	26.79
Airbus A330-200 Series	PW4168A Talon II	1	AC Eurofly	26.79
Airbus A330-200 Series	PW4168A Talon II	2	AC NWA	26.79
Airbus A330-300 Series	CF6-80E1A4 Standard	429	AC EIN	26.79
Airbus A330-300 Series	PW4168A Talon II	147	AC DLH	26.79
Airbus A330-300 Series	PW4168A Talon II	379	AC NWA	26.79
Airbus A340-300 Series	CFM56-5C2	116	AC AFR	26.79
Airbus A340-300 Series	CFM56-5C4/P SAC	337	AC DLH	26.79
Airbus A340-300 Series	CFM56-5C4/P SAC	152	AC Iberia	26.79
Airbus A340-300 Series	CFM56-5C4/P SAC	16	AC SWR	26.79
Airbus A340-300 Series	CFM56-5C4/P SAC	118	AC VIR	26.79
Airbus A340-500 Series	Trent 556-61 Phase 5	2	AC Etihad Airways	26.79
Airbus A340-600 Series	Trent 556-61 Phase 5	1	AC China Eastern Airlines	26.79
Airbus A340-600 Series	Trent 556-61 Phase 5	9	AC DLH	26.79
Airbus A340-600 Series	Trent 556-61 Phase 5	202	AC VIR	26.79
Boeing 717-200 Series	BR700-715A1-30	2,306	AC MEP	26.79
Boeing 717-200 Series	BR700-715A1-30	5,939	AC TRS	26.79
Boeing 727-200 Series	JT8D-15	34	AC CCP (Champion Air)	26.79
Boeing 727-200 Series	JT8D-9 series	2	AC RYN	26.79

Table I-1 2007 Fleet Mix, Annual Landing-and-Takeoff Cycles (LTOs), and Taxi/Idle Time-in-Mode by Aircraft Type (Continued)

Aircraft Type	Engine	LTOs	Description (Airline)	Taxi Times
Air Carrier Aircraft (Cont'd.)				
Boeing 737-200 Series	JT8D-15A	17	AC RYN	26.79
Boeing 737-200 Series	JT8D-15A	20	AC Sky King	26.79
Boeing 737-300 Series	CFM56-3-B1	8	AC Cayman Airways	26.79
Boeing 737-300 Series	CFM56-3-B1	1,251	AC COA	26.79
Boeing 737-300 Series	CFM56-3-B1	19	AC Pace	26.79
Boeing 737-300 Series	CFM56-3-B1	1,239	AC UAL	26.79
Boeing 737-300 Series	CFM56-3B-2	1,359	AC USA	26.79
Boeing 737-400 Series	CFM56-3B-2	2	AC All Other Charter	26.79
Boeing 737-400 Series	CFM56-3B-2	9	AC Miami Air	26.79
Boeing 737-400 Series	CFM56-3B-2	2,155	AC USA	26.79
Boeing 737-500 Series	CFM56-3C-1	3,805	AC COA	26.79
Boeing 737-500 Series	CFM56-3C-1	188	AC UAL	26.79
Boeing 737-700 Series	CFM56-7B22	65	AC AMX (Aeromexico)	26.79
Boeing 737-700 Series	CFM56-7B22	103	AC Cougar Leasing	26.79
Boeing 737-700 Series	CFM56-7B22	1	AC Royal Jordanian	26.79
Boeing 737-700 Series	CFM56-7B22	3,407	AC TRS	26.79
Boeing 737-700 Series	CFM56-7B24	120	AC ASA	26.79
Boeing 737-700 Series	CFM56-7B24	633	AC COA	26.79
Boeing 737-800 Series	CFM56-7B26	2	AC AAL	26.79
Boeing 737-800 Series	CFM56-7B26	480	AC ASA	26.79
Boeing 737-800 Series	CFM56-7B26	690	AC COA	26.79
Boeing 737-800 Series	CFM56-7B26	9	AC Cougar Leasing	26.79
Boeing 737-800 Series	CFM56-7B26	2,984	AC DAL	26.79
Boeing 737-800 Series	CFM56-7B26	149	AC Miami Air	26.79
Boeing 737-800 Series	CFM56-7B26	11	AC RYN	26.79
Boeing 737-800 Series	CFM56-7B26	2	AC SCX	26.79
Boeing 737-800 Series	CFM56-7B26	63	AC Xtra Airways	26.79
Boeing 737-900 Series	CFM56-7B26	111	AC ASA	26.79
Boeing 737-900 Series	CFM56-7B27	5	AC COA	26.79
Boeing 747-200 Series	JT9D-7A	2	AC Saudi Arabian	26.79
Boeing 747-400 Series	CF6-80C2B1F 1862M39	1	AC Cathay Pacific	26.79
Boeing 747-400 Series	CF6-80C2B1F 1862M39	265	AC DLH	26.79
Boeing 747-400 Series	CF6-80C2B1F 1862M39	1	AC KLM	26.79
Boeing 747-400 Series	CF6-80C2B1F 1862M39	46	AC VIR	26.79
Boeing 747-400 Series	PW4056	358	AC AFR	26.79
Boeing 747-400 Series	PW4056	3	AC Air China	26.79
Boeing 747-400 Series	RB211-524H	193	AC BAW	26.79
Boeing 757-200 Series	PW2037	6	AC All Other Charter	26.79
Boeing 757-200 Series	PW2037	2,468	AC DAL	26.79
Boeing 757-200 Series	PW2037	2	AC EIN	26.79
Boeing 757-200 Series	PW2037	33	AC FIN	26.79

Table I-1 2007 Fleet Mix, Annual Landing-and-Takeoff Cycles (LTOs), and Taxi/Idle Time-in-Mode by Aircraft Type (Continued)

Aircraft Type	Engine	LTOs	Description (Airline)	Taxi Times
Air Carrier Aircraft (Cont'd.)				
Boeing 757-200 Series	PW2037	6	AC Miami Air	26.79
Boeing 757-200 Series	PW2037	1,968	AC NWA	26.79
Boeing 757-200 Series	PW2037	1	AC Privatair	26.79
Boeing 757-200 Series	PW2037	1	AC Titan Airways	26.79
Boeing 757-200 Series	PW2037	5,408	AC UAL	26.79
Boeing 757-200 Series	RB211-535E4	10	AC AMT (ATA Airlines)	26.79
Boeing 757-200 Series	RB211-535E4	8	AC COA	26.79
Boeing 757-200 Series	RB211-535E4	431	AC ICE	26.79
Boeing 757-200 Series	RB211-535E4	95	AC NAO	26.79
Boeing 757-200 Series	RB211-535E4	10	AC RYN	26.79
Boeing 757-200 Series	RB211-535E4	1,219	AC USA	26.79
Boeing 757-200 Series	RB211-535E4B Phase 5	6,413	AC AAL	26.79
Boeing 757-300 Series	RB211-535E4B Phase 5	4	AC COA	26.79
Boeing 757-300 Series	RB211-535E4B Phase 5	3	AC ICE	26.79
Boeing 757-300 Series	RB211-535E4B Phase 5	229	AC NWA	26.79
Boeing 767-200 Series	CF6-80A1	29	AC AAL	26.79
Boeing 767-200 Series	CF6-80C2B2 1862M39	22	AC USA	26.79
Boeing 767-300 ER	PW4060	1	AC LOT Polish Airlines	26.79
Boeing 767-300 ER	PW4060	1	AC Privatair	26.79
Boeing 767-300 Series	CF6-80A2	61	AC DAL	26.79
Boeing 767-300 Series	CF6-80A2	2	AC NAO	26.79
Boeing 767-300 Series	CF6-80C2B6 1862M39	310	AC AAL	26.79
Boeing 767-300 Series	CF6-80C2B6 1862M39	442	AC AZA	26.79
Boeing 767-300 Series	PW4060	85	AC UAL	26.79
Boeing 767-300 Series	RB211-524H	1	AC BAW	26.79
Boeing 767-400 ER	CF6-80C2B7F 1862M39	6	AC DAL	26.79
Boeing 777-200 Series	GE90-85B DAC II	886	AC BAW	26.79
Boeing 777-200 Series	GE90-92B DAC I	3	AC AFR	26.79
Boeing 777-200 Series	GE90-92B DAC I	4	AC COA	26.79
Boeing 777-200 Series	GE90-94B DAC II	1	AC AZA	26.79
Boeing 777-200 Series	PW4077	1	AC Emirates	26.79
Boeing 777-200 Series	PW4077	2	AC UAL	26.79
Boeing 777-200 Series	Trent 892	743	AC AAL	26.79
Boeing 777-200 Series	Trent 892	4	AC DAL	26.79
Boeing DC-10-10 Series	CF6-6K	4	AC EIN	26.79
Boeing DC-10-10 Series	CF6-6K	1	AC Omni Air	26.79
Boeing DC-9-30 Series	JT8D-7 series	3	AC USA Jet Airlines	26.79
Boeing DC-9-30 Series	JT8D-9 series	58	AC NWA	26.79
Boeing DC-9-40 Series	JT8D-11	40	AC NWA	26.79
Boeing DC-9-50 Series	JT8D-17	76	AC NWA	26.79
Boeing MD-11	PW4460 reduced smoke	4	AC Saudi Arabian	26.79

Table I-1 2007 Fleet Mix, Annual Landing-and-Takeoff Cycles (LTOs), and Taxi/Idle Time-in-Mode by Aircraft Type (Continued)

Aircraft Type	Engine	LTOs	Description (Airline)	Taxi Times
Air Carrier Aircraft (Cont'd.)				
Boeing MD-81	JT8D-217C (E_Kit)	47	AC MEP	26.79
Boeing MD-82	JT8D-217 (E_Kit)	3,745	AC AAL	26.79
Boeing MD-82	JT8D-217 (E_Kit)	1	AC USA	26.79
Boeing MD-83	JT8D-219 (E_Kit)	2,900	AC AAL	26.79
Boeing MD-83	JT8D-219 (E_Kit)	1	AC COA	26.79
Boeing MD-88	JT8D-219 (E_Kit)	10,344	AC DAL	26.79
Boeing MD-88	JT8D-219 (E_Kit)	4	AC MEP	26.79
Boeing MD-90	V2525-D5	2	AC DAL	26.79
Bombardier Learjet 35	TFE731-2-2B	15	AC Omni Air	26.79
Cessna 550 Citation II	JT15D-4 series	2	AC Air Georgian	26.79
Dassault Falcon 20-C	CF700-2D	2	AC USA Jet Airlines	26.79
Embraer ERJ170	CF34-8E5A1 LEC	1,389	AC ACA	26.79
Embraer ERJ170	CF34-8E5A1 LEC	2	AC USA	26.79
Embraer ERJ190	CF34-10E	254	AC ACA	26.79
Embraer ERJ190	CF34-10E	8,049	AC JBU	26.79
Embraer ERJ190	CF34-10E	1,203	AC USA	26.79
Gulfstream G400	TAY Mk611-8	4	AC Saudi Arabian	26.79
Ilyushin 62 Classic	D-30KU	1	AC Rossiya	26.79
Raytheon Hawker 800	TFE731-3	15	AC All Other Charter	26.79
Total Air Carrier Aircraft LTOs		110,788		
Cargo Aircraft				
Airbus A300B4-200 Series	CF6-50C2 I	7	Cargo Astar	26.79
Airbus A300B4-600 Series	PW4158 reduced smoke	631	Cargo UPS	26.79
Airbus A300B4-600 Series	PW4158 reduced smoke	36	Cargo Wrangler Aviation	26.79
Airbus A300F4-600 Series	CF6-80C2A5F 1862M39	794	Cargo FDX	26.79
Airbus A310-200 Series	JT9D-7R4E, -7R4E1	27	Cargo FDX	26.79
Boeing 727-100 Series	JT8D-7 series	9	Cargo FDX	26.79
Boeing 727-100 Series	JT8D-7 series	1	Cargo Gulf & Caribbean	26.79
Boeing 727-100 Series	TAY 651 Transply	2	Cargo UPS	26.79
Boeing 727-200 Series	JT8D-15	491	Cargo Astar	26.79
Boeing 727-200 Series	JT8D-15	190	Cargo Capital Cargo	26.79
Boeing 727-200 Series	JT8D-15	657	Cargo FDX	26.79
Boeing 727-200 Series	JT8D-9 series	154	Cargo KHA	26.79
Boeing 737-300 Series	CFM56-3-B1	88	Cargo KHA	26.79
Boeing 747-200 Series	CF6-50E2	2	Cargo Southern Air	26.79
Boeing 747-200 Series	CF6-50E2	17	Cargo Yangtze River	26.79
Boeing 747-400 Series	CF6-80C2B1F 1862M39	1	Cargo Cargolux	26.79
Boeing 747-400 Series	CF6-80C2B1F 1862M39	19	Cargo Yangtze River	26.79
Boeing 757-200 Series	PW2040	4	Cargo UPS	26.79

Table I-1 2007 Fleet Mix, Annual Landing-and-Takeoff Cycles (LTOs), and Taxi/Idle Time-in-Mode by Aircraft Type (Continued)

Aircraft Type	Engine	LTOs	Description (Airline)	Taxi Times
Cargo Aircraft (Cont'd.)				
Boeing 767-300 ER	CF6-80C2B7F 1862M39	1	Cargo UPS	26.79
Boeing DC-10-10 Series	CF6-6D	812	Cargo FDX	26.79
Boeing DC-8 Series 60	JT3D-3B	2	Cargo ABX	26.79
Boeing DC-8 Series 70	CFM56-2A series	16	Cargo Air Transprt Intl	26.79
Boeing DC-8 Series 70	CFM56-2A series	36	Cargo UPS	26.79
Boeing DC-9-30 Series	JT8D-7 series	1	Cargo ABX	26.79
Boeing MD-11	CF6-80C2D1F 1862M39	2	Cargo EVA Air	26.79
Boeing MD-11	CF6-80C2D1F 1862M39	5	Cargo FDX	26.79
Boeing MD-11	CF6-80C2D1F 1862M39	1	Cargo World Airways	26.79
Bombardier Learjet 25	CJ610-6	8	Cargo Royal Air Freight	26.79
Bombardier Learjet 35	TFE731-2-2B	18	Cargo Airnet	26.79
Bombardier Learjet 35	TFE731-2-2B	1	Cargo Kalitta Charters	26.79
Ilyushin 62 Classic	D-30KU	2	Cargo Rossiya	26.79
Raytheon Beech 1900-C	PT6A-67D	260	Cargo Skylink Aviation	26.79
Total Cargo Aircraft LTOs		4,295		
Commuter Aircraft				
Bombardier CRJ-100	CF34-3A1 LEC II	11,379	Comm COM	26.79
Bombardier CRJ-100	CF34-3B	49	Comm ASH	26.79
Bombardier CRJ-100	CF34-3B	1,790	Comm JZA	26.79
Bombardier CRJ-200	CF34-3B	3,645	Comm Air Wisconsin	26.79
Bombardier CRJ-200	CF34-3B	905	Comm ASH	26.79
Bombardier CRJ-200	CF34-3B	3	Comm Atlantic Southeast	26.79
Bombardier CRJ-200	CF34-3B	90	Comm CAA	26.79
Bombardier CRJ-200	CF34-3B	2,820	Comm COM	26.79
Bombardier CRJ-200	CF34-3B	1,774	Comm Express Airlines	26.79
Bombardier CRJ-200	CF34-3B	55	Comm Jetstream Int'l	26.79
Bombardier CRJ-200	CF34-3B	2,114	Comm JZA	26.79
Bombardier CRJ-700	CF34-8C1	221	Comm ASH	26.79
Bombardier CRJ-700	CF34-8C1	1	Comm CAA	26.79
Bombardier CRJ-700	CF34-8C1	370	Comm COM	26.79
Bombardier CRJ-900	CF34-8C5 LEC	36	Comm ASH	26.79
Bombardier CRJ-900	CF34-8C5 LEC	126	Comm COM	26.79
Bombardier CRJ-900	CF34-8C5 LEC	99	Comm JZA	26.79
Bombardier deHavilland Dash 8	PW120A	177	Comm JZA	26.79
Bombardier deHavilland Dash 8	PW120A	748	Comm Piedmont Airlines	26.79
Bombardier deHavilland Dash 8	PW123	62	Comm JZA	26.79
Cessna 402	TIO-540-J2B2	13,273	Comm Hyannis Air	26.79
Embraer ERJ135	AE3007A1/3 Type 3	5	Comm Britt Airways	26.79
Embraer ERJ135	AE3007A1/3 Type 3	13,455	Comm EGF	26.79

Table I-1 2007 Fleet Mix, Annual Landing-and-Takeoff Cycles (LTOs), and Taxi/Idle Time-in-Mode by Aircraft Type (Continued)

Aircraft Type	Engine	LTOs	Description (Airline)	Taxi Times
Commuter Aircraft (Cont'd.)				
Embraer ERJ140	AE3007A1/3	222	Comm Chautauqua	26.79
Embraer ERJ145	AE3007A1E Type 3	639	Comm Britt Airways	26.79
Embraer ERJ145	AE3007A1E Type 3	2,673	Comm Chautauqua	26.79
Embraer ERJ145	AE3007A1E Type 3	20	Comm EGF	26.79
Embraer ERJ145	AE3007A1E Type 3	305	Comm Freedom Airlines	26.79
Embraer ERJ145	AE3007A1E Type 3	1	Comm LOF	26.79
Embraer ERJ170	CF34-8E5 LEC	324	Comm Shuttle America	26.79
Embraer ERJ170	CF34-8E5A1 LEC	366	Comm Republic Airlines	26.79
Raytheon Beech 1900-C	PT6A-65B	4,983	Comm CJC	26.79
Raytheon Beech 1900-C	PT6A-67D	4,199	Comm Big Sky Airlines	26.79
Raytheon Beech 1900-C	PT6A-67D	1,422	Comm UCA	26.79
Saab 340-B-Plus	CT7-5	2,019	Comm CJC	26.79
Total Commuter Aircraft LTOs		70,370		
General Aviation Aircraft				
BAE Jetstream 31	TPE331-10	69	GA	26.79
Bell 206 JetRanger	250B17B	22	GA	7.00
Boeing 707-300 Series	JT3D-3B	1	GA	26.79
Boeing 727-100 Series	JT8D-7 series	3	GA	26.79
Boeing 727-200 Series	JT8D-15	14	GA	26.79
Boeing 737-200 Series	JT8D-15A	3	GA	26.79
Boeing 737-300 Series	CFM56-3-B1	2	GA	26.79
Boeing 737-400 Series	CFM56-3B-2	5	GA	26.79
Boeing 737-700 Series	CFM56-7B22	11	GA	26.79
Boeing 767-200 Series	CF6-80C2B2 1862M39	6	GA	26.79
Boeing 767-300 Series	CF6-80A2	8	GA	26.79
Boeing DC-9-30 Series	JT8D-7 series	4	GA	26.79
Boeing DC-9-50 Series	JT8D-17	1	GA	26.79
Bombardier Challenger 600	ALF 502L-2	595	GA	26.79
Bombardier Challenger 600	ALF 502L-2	44	GA Bombardier	26.79
Bombardier Challenger 600	ALF 502L-2	5	GA Executive Jet	26.79
Bombardier Challenger 600	ALF 502L-2	23	GA TAG Aviation	26.79
Bombardier Challenger 604	CF34-3B	134	GA	26.79
Bombardier Challenger 604	CF34-3B	183	GA Bombardier	26.79
Bombardier Global Express	BR700-710A1-10	135	GA	26.79
Bombardier Global Express	BR700-710A1-10	3	GA TAG Aviation	26.79
Bombardier Learjet 24	CJ610-6	4	GA	26.79
Bombardier Learjet 25	CJ610-6	16	GA	26.79
Bombardier Learjet 31	TFE731-2-2B	89	GA	26.79
Bombardier Learjet 35	TFE731-2-2B	782	GA	26.79

Table I-1 2007 Fleet Mix, Annual Landing-and-Takeoff Cycles (LTOs), and Taxi/Idle Time-in-Mode by Aircraft Type (Continued)

Aircraft Type	Engine	LTOs	Description (Airline)	Taxi Times
General Aviation Aircraft (Cont'd.)				
Bombardier Learjet 35	TFE731-2-2B	224	GA Bombardier	26.79
Bombardier Learjet 35	TFE731-2-2B	2	GA Executive Jet	26.79
Bombardier Learjet 35	TFE731-2-2B	270	GA US Check	26.79
Cessna 172 Skyhawk	TSIO-360C	72	GA	26.79
Cessna 172 Skyhawk	TSIO-360C	47	GA Angel Flight America	26.79
Cessna 208 Caravan	PT6A-114	93	GA	26.79
Cessna 208 Caravan	PT6A-114	163	GA US Check	26.79
Cessna 337 Skymaster	TSIO-360C	94	GA	26.79
Cessna 337 Skymaster	TSIO-360C	5	GA Angel Flight America	26.79
Cessna 441 Conquest II	TPE331-8	16	GA	26.79
Cessna 441 Conquest II	TPE331-8	1	GA Angel Flight America	26.79
Cessna 500 Citation I	JT15D-1 series	196	GA	26.79
Cessna 500 Citation I	JT15D-1 series	119	GA Citation Shares	26.79
Cessna 550 Citation II	JT15D-4 series	366	GA	26.79
Cessna 550 Citation II	JT15D-4 series	162	GA Citation Shares	26.79
Cessna 560 Citation V	JT15D-5, -5A, -5B	532	GA	26.79
Cessna 560 Citation V	JT15D-5, -5A, -5B	127	GA Citation Shares	26.79
Cessna 560 Citation V	JT15D-5, -5A, -5B	17	GA Executive Jet	26.79
Cessna 560 Citation V	JT15D-5, -5A, -5B	1	GA Flight Options	26.79
Cessna 560 Citation V	JT15D-5, -5A, -5B	1,236	GA Netjets Aviation	26.79
Cessna 560 Citation V	JT15D-5, -5A, -5B	3	GA TAG Aviation	26.79
Cessna 650 Citation III	TFE731-3	387	GA	26.79
Cessna 650 Citation III	TFE731-3	2	GA Avantair	26.79
Cessna 650 Citation III	TFE731-3	43	GA Citation Shares	26.79
Cessna 650 Citation III	TFE731-3	15	GA Executive Jet	26.79
Cessna 650 Citation III	TFE731-3	1	GA Flight Options	26.79
Cessna 650 Citation III	TFE731-3	152	GA Netjets Aviation	26.79
Cessna 750 Citation X	AE3007C Type 1	192	GA	26.79
Cessna 750 Citation X	AE3007C Type 1	6	GA Executive Jet	26.79
Cessna 750 Citation X	AE3007C Type 1	28	GA Flight Options	26.79
Cessna 750 Citation X	AE3007C Type 1	439	GA Netjets Aviation	26.79
Cessna 750 Citation X	AE3007C Type 1	2	GA TAG Aviation	26.79
Dassault Falcon 100	TFE731-3	39	GA	26.79
Dassault Falcon 2000-EX	PW308C Annular	231	GA	26.79
Dassault Falcon 2000-EX	PW308C Annular	6	GA Executive Jet	26.79
Dassault Falcon 2000-EX	PW308C Annular	216	GA Netjets Aviation	26.79
Dassault Falcon 2000-EX	PW308C Annular	3	GA TAG Aviation	26.79
Dassault Falcon 20-C	CF700-2D	53	GA	26.79
Dassault Falcon 20-C	CF700-2D	2	GA TAG Aviation	26.79
Dassault Falcon 50	TFE731-3	460	GA	26.79
Dassault Falcon 50	TFE731-3	9	GA Executive Jet	26.79

Table I-1 2007 Fleet Mix, Annual Landing-and-Takeoff Cycles (LTOs), and Taxi/Idle Time-in-Mode by Aircraft Type (Continued)

Aircraft Type	Engine	LTOs	Description (Airline)	Taxi Times
General Aviation Aircraft (Cont'd.)				
Dassault Falcon 50	TFE731-3	1	GA Flight Options	26.79
Dassault Falcon 50	TFE731-3	15	GA TAG Aviation	26.79
Dornier 328 Jet	PW306B Annular	11	GA	26.79
EADS Socata TB-10 Tobago	IO-360-B	1	GA	26.79
Embraer EMB120 Brasilia	PW118	2	GA	26.79
Embraer ERJ140	AE3007A1/3	40	GA	26.79
Embraer ERJ140	AE3007A1/3	25	GA Flight Options	26.79
Fairchild SA-226-T Merlin III	TPE331-3	20	GA	26.79
Gulfstream G200	PW306A Annular	91	GA	26.79
Gulfstream G200	PW306A Annular	8	GA Executive Jet	26.79
Gulfstream G200	PW306A Annular	125	GA Netjets Aviation	26.79
Gulfstream G300	SPEY MK511-8	154	GA	26.79
Gulfstream G300	SPEY MK511-8	5	GA TAG Aviation	26.79
Gulfstream G400	TAY Mk611-8	667	GA	26.79
Gulfstream G400	TAY Mk611-8	29	GA Executive Jet	26.79
Gulfstream G400	TAY Mk611-8	12	GA TAG Aviation	26.79
Gulfstream G500	BR700-710A1-10	268	GA	26.79
Gulfstream G500	BR700-710A1-10	14	GA TAG Aviation	26.79
Gulfstream II	SPEY MK511-8	61	GA	26.79
Israel IAI-1124 Westwind I	CJ610-6	76	GA	26.79
Mitsubishi MU-300 Diamond	JT15D-4 series	19	GA	26.79
Pilatus PC-6 Porter	PT6A-42	438	GA	26.79
Pilatus PC-6 Porter	PT6A-42	3	GA Angel Flight America	26.79
Pilatus PC-6 Porter	PT6A-42	1	GA TAG Aviation	26.79
Piper PA-23 Apache/Aztec	TIO-540-J2B2	17	GA	26.79
Piper PA-23 Apache/Aztec	TIO-540-J2B2	10	GA Angel Flight America	26.79
Piper PA-24 Comanche	TIO-540-J2B2	24	GA	26.79
Piper PA-24 Comanche	TIO-540-J2B2	33	GA Angel Flight America	26.79
Piper PA-28 Cherokee Series	O-320	35	GA	26.79
Piper PA-28 Cherokee Series	O-320	34	GA Angel Flight America	26.79
Piper PA-31 Navajo	TIO-540-J2B2	211	GA	26.79
Piper PA-31 Navajo	TIO-540-J2B2	41	GA Angel Flight America	26.79
Piper PA-31 Navajo	TIO-540-J2B2	71	GA US Check	26.79
Piper PA-32 Cherokee Six	TIO-540-J2B2	36	GA	26.79
Piper PA-32 Cherokee Six	TIO-540-J2B2	16	GA Angle Flight America	26.79
Piper PA-42 Cheyenne Series	PT6A-41	50	GA	26.79
Raytheon Beech 1900-C	PT6A-65B	107	GA Avantair	26.79
Raytheon Beech 1900-C	PT6A-67D	54	GA	26.79
Raytheon Beech Baron 58	TIO-540-J2B2	120	GA	26.79
Raytheon Beech Baron 58	TIO-540-J2B2	2	GA Angel Flight America	26.79
Raytheon Beech Baron 58	TIO-540-J2B2	383	GA US Check	26.79

Table I-1 2007 Fleet Mix, Annual Landing-and-Takeoff Cycles (LTOs), and Taxi/Idle Time-in-Mode by Aircraft Type (Continued)

Aircraft Type	Engine	LTOs	Description (Airline)	Taxi Times
General Aviation Aircraft (Cont'd.)				
Raytheon Beechjet 400	JT15D-5, -5A, -5B	396	GA	26.79
Raytheon Beechjet 400	JT15D-5, -5A, -5B	271	GA Flight Options	26.79
Raytheon Beechjet 400	JT15D-5, -5A, -5B	202	GA Netjets Aviation	26.79
Raytheon Hawker 4000 Horizon	PW308A Annular	2	GA	26.79
Raytheon Hawker 800	TFE731-3	866	GA	26.79
Raytheon Hawker 800	TFE731-3	12	GA Executive Jet	26.79
Raytheon Hawker 800	TFE731-3	146	GA Flight Options	26.79
Raytheon Hawker 800	TFE731-3	312	GA Netjets Aviation	26.79
Raytheon Hawker 800	TFE731-3	16	GA TAG Aviation	26.79
Raytheon King Air 100	PT6A-28	35	GA	26.79
Raytheon King Air 90	PT6A-28	75	GA	26.79
Raytheon King Air 90	PT6A-28	3	GA Angel Flight	26.79
Raytheon Super King Air 200	PT6A-41	171	GA	26.79
Raytheon Super King Air 300	PT6A-60	125	GA	26.79
Rockwell Commander 700	IO-360-B	75	GA	26.79
Rockwell Commander 700	IO-360-B	58	GA Angel Flight America	26.79
Rockwell Sabreliner 80	CF700-2D	27	GA	26.79
Total General Aviation Aircraft LTOs		14,316		
Total Fleet LTOs		199,769		

Notes: Due to rounding of the operations (1 LTO = 2 Operations) there may be some differences (+/-) between the values reported here and those reported in *Chapter 2, Activity Levels.*
Aircraft taxi times are based on Logan Airport data obtained from the FAA Aviation System Performance Metrics (ASPM) database for 2007.

Ground Service Equipment/Alternative Fuels Conversion

For the 2007 analyses, ground service equipment (GSE) emissions were calculated using EDMS emission factors which are based on the U.S. EPA NONROAD2005 model in combination with the 2004 GSE time-in-mode survey and the GSE fuel types obtained from the aerodrome permit applications. In this way, the most up-to-date GSE fleet operational, conversion and emissions characteristics are used.

Table I-2 Ground Service Equipment Alternative Fuel Conversion Summary (kg/day)

Year	Pollutant	Percent Reduction	Calculated Emissions without Reduction	Reduction from AFVs	Calculated Emissions with Reduction
2000[1]	Volatile Organic Compounds (VOCs)	13.72%	178	24	154
	Oxides of Nitrogen (NO_x)	9.87%	369	36	333
	Carbon Monoxide (CO)	12.88%	6,124	789	5,335
2001[1]	VOCs	13.72%	166	23	143
	NO_x	9.87%	338	33	305
	CO	12.88%	5,960	768	5,193
2002[2]	VOCs	13.6%	286	39	247
	NO_x	8.0%	350	28	322
	CO	16.3%	6,174	1,004	5,170
2003[2]	VOCs	13.8%	263	36	227
	NO_x	8.0%	316	25	291
	CO	16.4%	5,692	934	4,758
2004[3]	VOCs	11.9%	212	25	187
	NO_x	6.6%	357	24	333
	CO	15.4%	4,236	650	3,586
2005[4]	VOCs	12.2%	203	25	178
	NO_x	6.9%	335	23	312
	CO	15.4%	4,175	643	3,531
	$PM_{10}/PM_{2.5}$	9.9%	11	1	10
2006[5]	VOCs	10.7%	86	9	77
	NO_x	7.5%	324	24	300
	CO	13.8%	1,841	255	1,586
	$PM_{10}/PM_{2.5}$	10.8%	10	1	9
2007[6]	VOCs	8.2%	85	7	78
	NO_x	5.1%	315	16	299
	CO	10.4%	2,124	220	1,904
	$PM_{10}/PM_{2.5}$	5.9%	10	<1	10

1 2000 and 2001 analyses used EDMS v4.03.
2 2002 and 2003 analyses used EDMS v4.11, which used updated emission factors from the NONROAD2002 Model.
3 2004 analyses used EDMS v4.21, which again used emission factors from the EPA NONROAD2002 Model.
4 2005 analysis used EDMS v4.5, which used emission factors from the EPA NONROAD2002 Model.
5 2006 analysis used EDMS v5.0.1, which used emission factors from the EPA NONROAD2005 Model.
6 2007 analysis used EDMS v5.0.2, which used emission factors from the EPA NONROAD2005 Model.

Motor Vehicle Emissions

The same methods that were previously used in the *2006 Environmental Data Report (2006 EDR)* were also employed to calculate motor vehicle emissions in this *2007 EDR*.

In the *2007 EDR*, the resultant emission factors were multiplied by average daily vehicle miles to calculate daily emissions. The on-airport traffic data are summarized in the vehicle miles traveled (VMT) analyses tables of *Appendix G, Ground Transportation Improvement*. Due to the new roadway configuration of the Ted Williams Tunnel, through-traffic no longer traverses through airport property. Therefore, emissions from these vehicles are no longer included as part of the airport emissions inventory beginning in 2003. Furthermore, MOBILE6 was used to obtain vehicle emissions at idle to estimate parking and curbside motor vehicle emissions.[1] Idling emissions are determined for a unit of time and multiplied by total idling time to reach the associated emissions. The input and output files of MOBILE6.2.03 are included as Tables I-3 and I-4.

1 Idle emissions factors in grams per hour are determined by multiplying the emissions factors at 2.5 miles per hour by 2.5, in accordance with EPA guidance (*MOBILE6 Refers to Mobile5 User Information Sheet #5* EPA, July 30, 1993).

Table I-3 MOBILE6.2.03 Input Files

```
* Calendar Year 2007 Generic MOBILE6 input file for Mesoscale Build/No-Build Analyses
* Filename MA07_MES.INP created on 10/7/05 by Craig Woleader, MADEP 617-348-4046, craig.woleader@state.ma.us
* revised 12/2/05 to include actual diesel rebuild effects
* Edited by Wayne Arner, KB Environmental Sciences, for specific speeds, to obtain emission factors for: VOC, CO, and NOx
*
**********     Header Section     **********
MOBILE6 INPUT FILE
*
POLLUTANTS        : HC CO NOX CO2
DATABASE OUTPUT   :
WITH FIELDNAMES   :
AGGREGATED OUTPUT :
EMISSIONS TABLE   : MA07_MES.tb1 REPLACE
REPORT FILE       : MA07_MES.txt REPLACE
*
RUN DATA
**********     Run Section #1    **********
> *** Summer 2007 ***

* Pollutant output format
EXPRESS HC AS VOC :
EXPAND BUS EFS    :

* Mass. specific user inputs -- require external data file
REG DIST          : 2005_REG.D
I/M DESC FILE     : MA_IM07.D

* Set Diesel Rebuild effects to 10% as per EPA
REBUILD EFFECTS   : 0.10

ANTI-TAMP PROG    :
00 84 50 11111 12222222 2 12 096. 22112122

STAGE II REFUELING :
91 3 84. 84.

* Inputs for LEV II
94+ LDG IMP       : MA_LEV2.D
T2 EXH PHASE-IN   : LEV2EXH.D
T2 EVAP PHASE-IN  : LEV2EVAP.D
T2 CERT           : LEV2CERT.D

* Meteorological inputs
MIN/MAX TEMP      : 68. 94.

* Fuel inputs
```

Table I-3 MOBILE6.2.03 Input Files

FUEL RVP : 6.8
FUEL PROGRAM : 2 N

DIESEL FRACTIONS :

0.000	0.000	0.000	0.000	0.003	0.003	0.002	0.002	0.002	0.002
0.001	0.001	0.001	0.000	0.001	0.001	0.003	0.001	0.002	0.000
0.015	0.009	0.056	0.070	0.119					
0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000
0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.003	0.003
0.006	0.013	0.017	0.019	0.020					
0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.000
0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.003	0.003
0.006	0.013	0.017	0.019	0.020					
0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.005
0.012	0.012	0.017	0.015	0.014	0.016	0.017	0.014	0.018	0.016
0.021	0.048	0.065	0.060	0.066					
0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.005	0.006	0.005
0.012	0.012	0.017	0.015	0.014	0.016	0.017	0.014	0.018	0.016
0.021	0.048	0.065	0.060	0.066					
0.176	0.176	0.176	0.176	0.170	0.207	0.202	0.206	0.243	0.176
0.285	0.267	0.212	0.255	0.295	0.249	0.251	0.188	0.175	0.182
0.186	0.219	0.184	0.170	0.143					
0.385	0.385	0.385	0.385	0.407	0.433	0.467	0.464	0.480	0.375
0.472	0.480	0.366	0.400	0.344	0.285	0.333	0.314	0.253	0.208
0.197	0.168	0.130	0.106	0.114					
0.674	0.674	0.674	0.674	0.634	0.664	0.719	0.717	0.744	0.715
0.565	0.810	0.803	0.644	0.654	0.605	0.525	0.389	0.356	0.376
0.108	0.136	0.154	0.148	0.120					
0.830	0.830	0.830	0.830	0.845	0.860	0.840	0.819	0.813	0.610
0.686	0.570	0.733	0.607	0.729	0.685	0.725	0.631	0.350	0.305
0.186	0.209	0.343	0.091	0.175					
0.884	0.884	0.884	0.884	0.840	0.887	0.931	0.917	0.914	0.923
0.901	0.908	0.898	0.903	0.876	0.804	0.844	0.782	0.702	0.679
0.554	0.529	0.568	0.628	0.571					
0.977	0.977	0.977	0.977	0.972	0.953	0.993	0.992	0.992	0.990
0.981	0.976	0.975	0.959	0.982	0.965	0.963	0.945	0.902	0.875
0.857	0.791	0.796	0.846	0.805					
0.972	0.972	0.972	0.972	0.955	0.984	0.995	0.992	0.991	0.995
0.993	0.993	0.995	0.992	0.986	0.995	0.981	0.993	0.971	0.982
0.977	0.993	0.987	0.986	0.988					
1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
1.000	1.000	1.000	1.000	1.000					
0.786	0.786	0.786	0.786	0.917	0.884	0.925	0.968	0.961	0.972
0.985	0.971	0.941	0.905	0.965	0.940	0.907	0.964	0.609	0.880
1.000	0.778	0.500	1.000	0.000					

********** Scenario Section **********

SCENARIO RECORD : 2007 DEFAULT SPEED - Summer
CALENDAR YEAR : 2007
EVALUATION MONTH : 7

Table I-3 MOBILE6.2.03 Input Files

```
SCENARIO RECORD    : 2007 Idle Scenario - Summer (multiply g/mi by 2.5 mph to get g/hr)
CALENDAR YEAR      : 2007
EVALUATION MONTH   : 7
AVERAGE SPEED      : 2.5 Arterial 0.0 100.0 0.0 0.0

SCENARIO RECORD    : 2007 Arterial Scenario 15 mph - Summer
CALENDAR YEAR      : 2007
EVALUATION MONTH   : 7
AVERAGE SPEED      : 15 Arterial 0.0 100.0 0.0 0.0

SCENARIO RECORD    : 2007 Arterial Scenario 20 mph - Summer
CALENDAR YEAR      : 2007
EVALUATION MONTH   : 7
AVERAGE SPEED      : 20 Arterial 0.0 100.0 0.0 0.0

SCENARIO RECORD    : 2007 Arterial Scenario 25 mph - Summer
CALENDAR YEAR      : 2007
EVALUATION MONTH   : 7
AVERAGE SPEED      : 25 Arterial 0.0 100.0 0.0 0.0

SCENARIO RECORD    : 2007 Arterial Scenario 30 mph - Summer
CALENDAR YEAR      : 2007
EVALUATION MONTH   : 7
AVERAGE SPEED      : 30 Arterial 0.0 100.0 0.0 0.0

SCENARIO RECORD    : 2007 Arterial Scenario 35 mph - Summer
CALENDAR YEAR      : 2007
EVALUATION MONTH   : 7
AVERAGE SPEED      : 35 Arterial 0.0 100.0 0.0 0.0

SCENARIO RECORD    : 2007 Arterial Scenario 50 mph - Summer
CALENDAR YEAR      : 2007
EVALUATION MONTH   : 7
AVERAGE SPEED      : 50 Arterial 0.0 100.0 0.0 0.0
**********     End of This Run     **********
END OF RUN

* Calendar Year 2007 Generic MOBILE6 input file for Mesoscale Build/No-Build Analyses, Ozone, CO, and PM
* Filename MA07PM03.INP created on 8/2/06 by Marc Bennett, MADEP 617-292-5597, marc.bennett@state.ma.us
* Edited by Wayne Arner, KB Environmental Sciences, for specific speeds, to obtain PM emission factors
*
**********     Header Section     **********
MOBILE6 INPUT FILE
*
PARTICULATES      :
```

Table I-3 MOBILE6.2.03 Input Files

```
POLLUTANTS        : HC CO NOX CO2
DATABASE OUTPUT   :
WITH FIELDNAMES   :
AGGREGATED OUTPUT :
EMISSIONS TABLE   : MA07PM03.tb1 REPLACE
REPORT FILE       : MA07PM03.txt REPLACE
*
RUN DATA
**************    Run Section #1    **************
> *** Summer 2007 ***

* Pollutant output format
EXPRESS HC AS VOC :
EXPAND BUS EFS    :

* Mass. specific user inputs -- require external data file
REG DIST          : 2005_REG.D
I/M DESC FILE     : MA_IM07.D

ANTI-TAMP PROG    :
00 84 50 11111 12222222 2 12 096. 22112122

* Set Diesel Rebuild effects to 10% as per EPA
REBUILD EFFECTS   : 0.10

STAGE II REFUELING :
91 3 84. 84.

* Inputs for LEV II
94+ LDG IMP       : MA_LEV2.D
T2 EXH PHASE-IN   : LEV2EXH.D
T2 EVAP PHASE-IN  : LEV2EVAP.D
T2 CERT           : LEV2CERT.D

* Meteorological inputs
MIN/MAX TEMP      : 68. 94.

* Fuel inputs
FUEL RVP          : 6.8
FUEL PROGRAM      : 2 N

DIESEL FRACTIONS  :
0.000  0.000  0.000  0.000  0.003  0.003  0.002  0.002  0.002  0.002
0.001  0.001  0.001  0.000  0.001  0.001  0.003  0.001  0.002  0.000
0.015  0.009  0.056  0.070  0.119
0.001  0.001  0.001  0.001  0.001  0.001  0.001  0.001  0.001  0.000
0.001  0.001  0.001  0.001  0.001  0.001  0.002  0.002  0.003  0.003
```

Table I-3 MOBILE6.2.03 Input Files

```
0.006   0.013   0.017   0.019   0.020
0.001   0.001   0.001   0.001   0.001   0.001   0.001   0.001   0.001   0.000
0.001   0.001   0.001   0.001   0.001   0.001   0.002   0.002   0.003   0.003
0.006   0.013   0.017   0.019   0.020
0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.006   0.005
0.012   0.012   0.017   0.015   0.014   0.016   0.017   0.014   0.018   0.016
0.021   0.048   0.065   0.060   0.066
0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.005   0.006   0.005
0.012   0.012   0.017   0.015   0.014   0.016   0.017   0.014   0.018   0.016
0.021   0.048   0.065   0.060   0.066
0.176   0.176   0.176   0.176   0.170   0.207   0.202   0.206   0.243   0.176
0.285   0.267   0.212   0.255   0.295   0.249   0.251   0.188   0.175   0.182
0.186   0.219   0.184   0.170   0.143
0.385   0.385   0.385   0.385   0.407   0.433   0.467   0.464   0.480   0.375
0.472   0.480   0.366   0.400   0.344   0.285   0.333   0.314   0.253   0.208
0.197   0.168   0.130   0.106   0.114
0.674   0.674   0.674   0.674   0.634   0.664   0.719   0.717   0.744   0.715
0.565   0.810   0.803   0.644   0.654   0.605   0.525   0.389   0.356   0.376
0.108   0.136   0.154   0.148   0.120
0.830   0.830   0.830   0.830   0.845   0.860   0.840   0.819   0.813   0.610
0.686   0.570   0.733   0.607   0.729   0.685   0.725   0.631   0.350   0.305
0.186   0.209   0.343   0.091   0.175
0.884   0.884   0.884   0.884   0.840   0.887   0.931   0.917   0.914   0.923
0.901   0.908   0.898   0.903   0.876   0.804   0.844   0.782   0.702   0.679
0.554   0.529   0.568   0.628   0.571
0.977   0.977   0.977   0.977   0.972   0.953   0.993   0.992   0.992   0.990
0.981   0.976   0.975   0.959   0.982   0.965   0.963   0.945   0.902   0.875
0.857   0.791   0.796   0.846   0.805
0.972   0.972   0.972   0.972   0.955   0.984   0.995   0.992   0.991   0.995
0.993   0.993   0.995   0.992   0.986   0.995   0.981   0.993   0.971   0.982
0.977   0.993   0.987   0.986   0.988
1.000   1.000   1.000   1.000   1.000   1.000   1.000   1.000   1.000   1.000
1.000   1.000   1.000   1.000   1.000   1.000   1.000   1.000   1.000   1.000
1.000   1.000   1.000   1.000   1.000
0.786   0.786   0.786   0.786   0.917   0.884   0.925   0.968   0.961   0.972
0.985   0.971   0.941   0.905   0.965   0.940   0.907   0.964   0.609   0.880
1.000   0.778   0.500   1.000   0.000
**********  Scenario Section  **********

SCENARIO RECORD    : PM 10 - Idle Scenario - Summer (multiply g/mi by 2.5 mph to get g/hr)
CALENDAR YEAR      : 2007
EVALUATION MONTH   : 7
PARTICULATE EF     : PMGZML.CSV  PMGDR1.CSV  PMGDR2.CSV  PMDZML.CSV  PMDDR1.CSV  PMDDR2.CSV
PARTICLE SIZE      : 10
DIESEL SULFUR      : 350
AVERAGE SPEED      : 2.5 Arterial 0.0 100.0 0.0 0.0

SCENARIO RECORD    : PM 10 - Summer 15 mph
CALENDAR YEAR      : 2007
EVALUATION MONTH   : 7
PARTICULATE EF     : PMGZML.CSV  PMGDR1.CSV  PMGDR2.CSV  PMDZML.CSV  PMDDR1.CSV  PMDDR2.CSV
PARTICLE SIZE      : 10
```

Table I-3 MOBILE6.2.03 Input Files

```
DIESEL SULFUR     : 350
AVERAGE SPEED     : 15 Arterial 0.0 100.0 0.0 0.0
SCENARIO RECORD   : PM 10 - Summer 20 mph
CALENDAR YEAR     : 2007
EVALUATION MONTH  : 7
PARTICULATE EF    : PMGZML.CSV  PMGDR1.CSV  PMGDR2.CSV  PMDZML.CSV  PMDDR1.CSV  PMDDR2.CSV
PARTICLE SIZE     : 10
DIESEL SULFUR     : 350
AVERAGE SPEED     : 20 Arterial 0.0 100.0 0.0 0.0

SCENARIO RECORD   : PM 10 - Summer 25 mph
CALENDAR YEAR     : 2007
EVALUATION MONTH  : 7
PARTICULATE EF    : PMGZML.CSV  PMGDR1.CSV  PMGDR2.CSV  PMDZML.CSV  PMDDR1.CSV  PMDDR2.CSV
PARTICLE SIZE     : 10
DIESEL SULFUR     : 350
AVERAGE SPEED     : 25 Arterial 0.0 100.0 0.0 0.0

SCENARIO RECORD   : PM 10 - Summer 30 mph
CALENDAR YEAR     : 2007
EVALUATION MONTH  : 7
PARTICULATE EF    : PMGZML.CSV  PMGDR1.CSV  PMGDR2.CSV  PMDZML.CSV  PMDDR1.CSV  PMDDR2.CSV
PARTICLE SIZE     : 10
DIESEL SULFUR     : 350
AVERAGE SPEED     : 30 Arterial 0.0 100.0 0.0 0.0

SCENARIO RECORD   : PM 10 - Summer 35 mph
CALENDAR YEAR     : 2007
EVALUATION MONTH  : 7
PARTICULATE EF    : PMGZML.CSV  PMGDR1.CSV  PMGDR2.CSV  PMDZML.CSV  PMDDR1.CSV  PMDDR2.CSV
PARTICLE SIZE     : 10
DIESEL SULFUR     : 350
AVERAGE SPEED     : 35 Arterial 0.0 100.0 0.0 0.0

SCENARIO RECORD   : PM 10 - Summer 50 mph
CALENDAR YEAR     : 2007
EVALUATION MONTH  : 7
PARTICULATE EF    : PMGZML.CSV  PMGDR1.CSV  PMGDR2.CSV  PMDZML.CSV  PMDDR1.CSV  PMDDR2.CSV
PARTICLE SIZE     : 10
DIESEL SULFUR     : 350
AVERAGE SPEED     : 50 Arterial 0.0 100.0 0.0 0.0

**********    End of This Run    **********
END OF RUN
```

Table I-4 MOBILE6.2.03 Output Files

```
**************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                             *
* Input file: MA07_MES.INP (file 1, run 1).                              *
**************************************************************************
* *** Summer 2007 ***

* Reading Registration Distributions from the following external
* data file: 2005_REG.D
  M 49 Warning:
            1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
           0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
           0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
           0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
            1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
            1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
           0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
           0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
            1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
           0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
            1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
            1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
            1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
            1.00     MYR sum not = 1. (will normalize)

* Reading I/M program description records from the following external
* data file: MA_IM07.D
* I/M program inputs for 2007 calendar year model run
* MA31 Exhaust I/M program for Light Duty pre-1996 MY vehicles <=10,0000 lb GVWR

* Reading non-default I/M CUTPOINTS from the following external
* data file: MA07_CUT.D
* Two-Speed Idle Exhaust I/M program for Heavy Duty vehicles >10,000 lb GVWR
```

Table I-4 MOBILE6.2.03 Output Files

```
* OBD Exhaust I/M program for Light Duty MY 1996+ vehicles <=10,000 lb GVWR
* Gas Cap Evap I/M program thru CY 2003 for all Light Duty vehicles <=8,500 lb GVWR
* Gas Cap Evap I/M program for all MY Heavy Duty vehicles >8,500 lb GVWR
* OBD + Gas Cap Evap I/M program for MY 1996 - 2003 Light Duty vehicles <=8,500 lb GVWR starting 2004
* OBD Evap I/M program for MY 2004+
  M601 Comment:
            User has enabled STAGE II REFUELING.


* Reading 94+ LEV IMPLEMENTATION SCHEDULE from the following external
* data file: MA_LEV2.D

  Reading User Supplied Tier2 Exhaust bin phase-in fractions

     Data read from file: LEV2EXH.D


  Reading User Supplied Tier2 EVAP phase-in fractions

     Data read from file: LEV2EVAP.D


  Reading User Supplied Tier2 50K certification standards

     Data read from file: LEV2CERT.D

  M616 Comment:
            User has supplied post-1999 sulfur levels.
  M614 Comment:
            User supplied diesel sale fractions.

* ##########################
* 2007 DEFAULT SPEED - Summer
* File 1, Run 1, Scenario 1.
* ##########################
*** I/M credits for Tech1&2 vehicles were read from the following external
    data file: TECH12.D
  M 48 Warning:
           there are no sales for vehicle class HDGV8b
 HDDV DEFEAT DEVICE EFFECTS ARE PRESENT. THE REBUILD FRACTION IS 0.10.

 LEV phase-in data read from file MA_LEV2.D
                 Calendar Year:  2007
                       Month:  July
                    Altitude:  Low
              Minimum Temperature:  68.0 (F)
```

Table I-4 MOBILE6.2.03 Output Files

```
          Maximum Temperature:  94.0 (F)
            Absolute Humidity:   75. grains/lb
          Fuel Sulfur Content:   30. ppm

          Exhaust I/M Program:  Yes
            Evap I/M Program:  Yes
               ATP Program:  Yes
            Reformulated Gas:  Yes

     Vehicle Type:     LDGV    LDGT12    LDGT34     LDGT      HDGV      LDDV      LDDT      HDDV       MC   All Veh
          GVWR:             <6000     >6000     (All)
                 ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.3652    0.3631    0.1427            0.0364    0.0007    0.0014    0.0864    0.0040    1.0000
Fuel Economy (mpg):      24.1      18.6      14.3      17.1       9.9      30.0      18.3       7.2      50.0      16.5
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      0.638     0.489     0.581     0.515     0.663    0.521     0.441     0.467     3.97     0.575
    Composite CO  :      6.43      6.43      7.56      6.75      7.92     1.616     0.822     2.447     17.09     6.333
    Composite NOX :      0.543     0.608     0.936     0.701     2.761    1.108     0.806     9.914     1.27     1.516
    Composite CO2 :    368.5     477.0     621.7     517.8     897.4    339.7     556.1    1404.6     177.4    552.23
 ---------------------------------------------------------------------------------------------------------------------
        Veh. Type:    GasBUS     URBAN     SCHOOL
                 ------    ------    ------
         VMT Mix:    0.0002    0.0009    0.0016
Fuel Economy (mpg):       6.4       4.3       6.2
---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      0.605     0.369     0.583
    Composite CO  :      9.10      3.602     1.903
    Composite NOX :      3.806    14.695    10.272
    Composite CO2 :   1376.2    2350.8    1646.3
---------------------------------------------------------------------------------------------------------------------

* ##########################
* 2007 Idle Scenario - Summer (multiply g/mi by 2.5 mph to get g/hr)
* File 1, Run 1, Scenario 2.
* ##########################
  M583 Warning:
          The user supplied arterial average speed of  2.5
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.
  M 48 Warning:
           there are no sales for vehicle class HDGV8b

  LEV phase-in data read from file MA_LEV2.D
```

Table I-4 MOBILE6.2.03 Output Files

```
              Calendar Year:  2007
                     Month:  July
                  Altitude:  Low
          Minimum Temperature:  68.0 (F)
          Maximum Temperature:  94.0 (F)
           Absolute Humidity:   75. grains/lb
          Fuel Sulfur Content:   30. ppm

          Exhaust I/M Program:  Yes
            Evap I/M Program:  Yes
               ATP Program:  Yes
            Reformulated Gas:  Yes

    Vehicle Type:     LDGV   LDGT12   LDGT34     LDGT     HDGV     LDDV     LDDT     HDDV       MC   All Veh
         GVWR:           <6000    >6000    (All)
                ------   ------   ------   ------   ------   ------   ------   ------   ------   ------
 VMT Distribution:   0.3652   0.3631   0.1427           0.0364   0.0007   0.0014   0.0864   0.0040   1.0000
Fuel Economy (mpg):     24.1     18.6     14.3     17.1      9.9     30.0     18.3      7.2     50.0     16.5
 ---------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
   Composite VOC :     4.948    3.341    3.482    3.381    4.837    1.119    1.056    1.446    12.71    3.871
   Composite CO  :    18.32    15.48    18.93    16.45    36.71    4.468    2.535   10.854   119.90   17.775
   Composite NOX :     1.221    1.191    1.809    1.366    2.020    1.777    1.303   15.233     1.12    2.534
   Composite CO2 :   368.4    476.9    621.7    517.8    897.3    339.7    556.1   1404.5    177.4   552.18
 ---------------------------------------------------------------------------------------------------------------
       Veh. Type:   GasBUS    URBAN    SCHOOL
                ------   ------   ------
        VMT Mix:   0.0002   0.0009   0.0016
Fuel Economy (mpg):      6.4      4.3      6.2
---------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
   Composite VOC :    3.664    1.141    1.805
   Composite CO  :   42.21    15.976    8.441
   Composite NOX :    2.785   24.370   17.011
   Composite CO2 : 1376.1   2350.6   1646.2
---------------------------------------------------------------------------------------------------------------

* ##########################
* 2007 Arterial Scenario 15 mph - Summer
* File 1, Run 1, Scenario 3.
* ##########################
  M583 Warning:
        The user supplied arterial average speed of 15.0
        will be used for all hours of the day.  100% of VMT
        has been assigned to the arterial/collector roadway
        type for all hours of the day and all vehicle types.
```

Table I-4 MOBILE6.2.03 Output Files

```
 M 48 Warning:
          there are no sales for vehicle class HDGV8b

LEV phase-in data read from file MA_LEV2.D
               Calendar Year:  2007
                    Month:  July
                  Altitude:  Low
          Minimum Temperature:  68.0 (F)
          Maximum Temperature:  94.0 (F)
            Absolute Humidity:   75. grains/lb
          Fuel Sulfur Content:   30. ppm

          Exhaust I/M Program:  Yes
            Evap I/M Program:  Yes
               ATP Program:  Yes
            Reformulated Gas:  Yes

     Vehicle Type:     LDGV    LDGT12    LDGT34     LDGT     HDGV     LDDV     LDDT     HDDV       MC   All Veh
          GVWR:             <6000     >6000     (All)
                 ------   ------   ------   ------   ------   ------   ------   ------   ------   ------
  VMT Distribution:    0.3652    0.3631    0.1427           0.0364    0.0007    0.0014    0.0864    0.0040    1.0000
Fuel Economy (mpg):     24.1      18.6      14.3      17.1      9.9      30.0      18.3      7.2      50.0      16.5
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      0.790     0.605     0.728     0.640     1.081    0.725     0.651     0.801     4.78     0.741
    Composite CO  :      6.38      6.22      7.41      6.56      13.72     2.282     1.222     4.409     25.21     6.631
    Composite NOX :      0.671     0.714     1.093     0.821     2.283    1.162     0.846     10.012     1.01     1.614
    Composite CO2 :    368.4     476.9     621.7     517.8     897.3    339.7     556.1     1404.5     177.4    552.18
 ---------------------------------------------------------------------------------------------------------------------
       Veh. Type:    GasBUS     URBAN     SCHOOL
                 ------   ------   ------
         VMT Mix:    0.0002    0.0009    0.0016
Fuel Economy (mpg):      6.4       4.3       6.2
---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      0.993     0.631     0.999
    Composite CO  :     15.77      6.489     3.428
    Composite NOX :      3.147    15.466    10.810
    Composite CO2 :   1376.1    2350.6    1646.2
---------------------------------------------------------------------------------------------------------------------

* ##########################
* 2007 Arterial Scenario 20 mph - Summer
* File 1, Run 1, Scenario 4.
* ##########################
  M583 Warning:
```

Table I-4 MOBILE6.2.03 Output Files

```
         The user supplied arterial average speed of 20.0
         will be used for all hours of the day.  100% of VMT
         has been assigned to the arterial/collector roadway
         type for all hours of the day and all vehicle types.
 M 48 Warning:
          there are no sales for vehicle class HDGV8b

LEV phase-in data read from file MA_LEV2.D
               Calendar Year:  2007
                     Month:  July
                  Altitude:  Low
           Minimum Temperature:  68.0 (F)
           Maximum Temperature:  94.0 (F)
            Absolute Humidity:   75. grains/lb
           Fuel Sulfur Content:   30. ppm

           Exhaust I/M Program:  Yes
             Evap I/M Program:  Yes
                ATP Program:  Yes
             Reformulated Gas:  Yes

     Vehicle Type:     LDGV    LDGT12    LDGT34     LDGT     HDGV     LDDV     LDDT     HDDV       MC   All Veh
          GVWR:              <6000     >6000     (All)
                  ------   ------   ------   ------   ------   ------   ------   ------   ------   ------
  VMT Distribution:   0.3652   0.3631   0.1427           0.0364   0.0007   0.0014   0.0864   0.0040   1.0000
Fuel Economy (mpg):     24.1     18.6     14.3     17.1      9.9     30.0     18.3      7.2     50.0     16.5
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      0.692    0.526    0.632    0.556    0.852    0.637    0.560    0.657     4.31    0.640
    Composite CO  :     5.89     5.81     6.91     6.12     10.19    1.915    1.002    3.330     20.06    5.987
    Composite NOX :      0.600    0.650    1.001    0.749    2.388    1.042    0.757    8.993     1.06    1.468
    Composite CO2 :    368.4    476.9    621.7    517.8    897.3    339.7    556.1    1404.5     177.4    552.18
 ---------------------------------------------------------------------------------------------------------------------
       Veh. Type:    GasBUS     URBAN    SCHOOL
                  ------   ------   ------
         VMT Mix:    0.0002   0.0009   0.0016
 Fuel Economy (mpg):      6.4      4.3      6.2
---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :     0.783    0.518    0.820
    Composite CO  :    11.71     4.901    2.589
    Composite NOX :     3.292    13.728    9.600
    Composite CO2 :  1376.1    2350.6    1646.2
---------------------------------------------------------------------------------------------------------------------

*##########################
```

Table I-4 MOBILE6.2.03 Output Files

```
* 2007 Arterial Scenario 25 mph - Summer
* File 1, Run 1, Scenario 5.
* ##########################
 M583 Warning:
        The user supplied arterial average speed of 25.0
        will be used for all hours of the day.  100% of VMT
        has been assigned to the arterial/collector roadway
        type for all hours of the day and all vehicle types.
 M 48 Warning:
         there are no sales for vehicle class HDGV8b

LEV phase-in data read from file MA_LEV2.D
              Calendar Year:  2007
                   Month:  July
                Altitude:  Low
          Minimum Temperature:  68.0 (F)
          Maximum Temperature:  94.0 (F)
           Absolute Humidity:   75. grains/lb
          Fuel Sulfur Content:   30. ppm

          Exhaust I/M Program:  Yes
            Evap I/M Program:  Yes
               ATP Program:  Yes
            Reformulated Gas:  Yes

    Vehicle Type:     LDGV   LDGT12   LDGT34     LDGT     HDGV     LDDV     LDDT     HDDV       MC   All Veh
         GVWR:             <6000    >6000    (All)
                ------   ------   ------   ------   ------   ------   ------   ------   ------   ------
 VMT Distribution:   0.3652   0.3631   0.1427           0.0364   0.0007   0.0014   0.0864   0.0040   1.0000
Fuel Economy (mpg):     24.1     18.6     14.3     17.1      9.9     30.0     18.3      7.2     50.0     16.5
 ---------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
   Composite VOC :     0.638    0.485    0.582    0.513    0.711   0.572    0.494    0.551     4.02    0.583
   Composite CO  :     5.69     5.67     6.73     5.97     7.99    1.679    0.860    2.632    16.90    5.685
   Composite NOX :     0.556    0.611    0.944    0.705    2.493   0.967    0.701    8.353     1.12    1.378
   Composite CO2 :   368.4    476.9    621.7    517.8    897.3   339.7    556.1   1404.5     177.4   552.18
 ---------------------------------------------------------------------------------------------------------------
       Veh. Type:    GasBUS    URBAN    SCHOOL
                ------   ------   ------
        VMT Mix:   0.0002   0.0009   0.0016
Fuel Economy (mpg):      6.4      4.3      6.2
---------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
   Composite VOC :     0.654    0.434    0.687
   Composite CO  :     9.19     3.873    2.046
   Composite NOX :     3.436   12.636    8.840
```

Table I-4 MOBILE6.2.03 Output Files

```
   Composite CO2 :  1376.1    2350.6    1646.2
-------------------------------------------------------------------------------------------------------------------------

* ##########################
* 2007 Arterial Scenario 30 mph - Summer
* File 1, Run 1, Scenario 6.
* ##########################
 M583 Warning:
        The user supplied arterial average speed of 30.0
        will be used for all hours of the day.  100% of VMT
        has been assigned to the arterial/collector roadway
        type for all hours of the day and all vehicle types.
 M 48 Warning:
         there are no sales for vehicle class HDGV8b

LEV phase-in data read from file MA_LEV2.D
              Calendar Year:  2007
                   Month:  July
                Altitude:  Low
          Minimum Temperature:  68.0 (F)
          Maximum Temperature:  94.0 (F)
           Absolute Humidity:   75. grains/lb
          Fuel Sulfur Content:   30. ppm

          Exhaust I/M Program:  Yes
            Evap I/M Program:  Yes
               ATP Program:  Yes
            Reformulated Gas:  Yes

    Vehicle Type:     LDGV    LDGT12    LDGT34     LDGT     HDGV     LDDV     LDDT     HDDV       MC   All Veh
         GVWR:             <6000     >6000     (All)
                ------   ------   ------   ------   ------   ------   ------   ------   ------   ------
 VMT Distribution:   0.3652   0.3631   0.1427            0.0364   0.0007   0.0014   0.0864   0.0040   1.0000
Fuel Economy (mpg):     24.1     18.6     14.3     17.1      9.9     30.0     18.3      7.2     50.0     16.5
 -------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
   Composite VOC :      0.603     0.460     0.553     0.486     0.618    0.524     0.445     0.472     3.81     0.546
   Composite CO  :      5.66      5.68      6.71      5.97      6.63     1.524     0.767     2.177     14.61     5.576
   Composite NOX :      0.525     0.585     0.906     0.676     2.598    0.928     0.671     8.018     1.18     1.327
   Composite CO2 :    368.4     476.9     621.7     517.8     897.3    339.7     556.1    1404.5     177.4    552.18
 -------------------------------------------------------------------------------------------------------------------------
      Veh. Type:    GasBUS     URBAN     SCHOOL
                ------   ------   ------
        VMT Mix:   0.0002   0.0009   0.0016
Fuel Economy (mpg):      6.4      4.3      6.2
```

Table I-4 MOBILE6.2.03 Output Files

```
Composite Emission Factors (g/mi):
   Composite VOC :    0.568    0.372    0.589
   Composite CO  :    7.62     3.204    1.693
   Composite NOX :    3.581    12.064   8.441
   Composite CO2 :  1376.1    2350.6   1646.2
-------------------------------------------------------------------------------------------------------------------

*#########################
* 2007 Arterial Scenario 35 mph - Summer
* File 1, Run 1, Scenario 7.
*#########################
 M583 Warning:
        The user supplied arterial average speed of 35.0
        will be used for all hours of the day.  100% of VMT
        has been assigned to the arterial/collector roadway
        type for all hours of the day and all vehicle types.
 M 48 Warning:
         there are no sales for vehicle class HDGV8b

LEV phase-in data read from file MA_LEV2.D
              Calendar Year:  2007
                   Month:  July
                Altitude:  Low
          Minimum Temperature:  68.0 (F)
          Maximum Temperature:  94.0 (F)
           Absolute Humidity:   75. grains/lb
          Fuel Sulfur Content:   30. ppm

          Exhaust I/M Program:  Yes
            Evap I/M Program:  Yes
               ATP Program:  Yes
            Reformulated Gas:  Yes

    Vehicle Type:     LDGV   LDGT12   LDGT34     LDGT     HDGV     LDDV     LDDT     HDDV       MC   All Veh
         GVWR:           <6000    >6000    (All)
                ------   ------   ------   ------   ------   ------   ------   ------   ------   ------
 VMT Distribution:   0.3652   0.3631   0.1427           0.0364   0.0007   0.0014   0.0864   0.0040   1.0000
Fuel Economy (mpg):     24.1     18.6     14.3     17.1      9.9     30.0     18.3      7.2     50.0     16.5
 -------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
   Composite VOC :     0.578    0.442    0.530    0.467    0.554   0.488    0.408    0.414    3.64     0.518
   Composite CO  :     5.78     5.81     6.86     6.11     5.80    1.425    0.708    1.884    12.92    5.628
   Composite NOX :     0.508    0.572    0.890    0.662    2.703   0.920    0.665    7.950    1.22     1.312
   Composite CO2 :   368.4    476.9    621.7    517.8    897.3   339.7    556.1   1404.5    177.4    552.18
 -------------------------------------------------------------------------------------------------------------------
       Veh. Type:    GasBUS    URBAN    SCHOOL
```

Table I-4 MOBILE6.2.03 Output Files

```
         VMT Mix:    0.0002    0.0009    0.0016
 Fuel Economy (mpg):      6.4       4.3       6.2
 ---------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :     0.509     0.326     0.516
    Composite CO  :     6.67      2.774     1.465
    Composite NOX :     3.726    11.949     8.361
    Composite CO2 :  1376.1    2350.6    1646.2
 ---------------------------------------------------------------------------------------------------------------

* ##########################
* 2007 Arterial Scenario 50 mph - Summer
* File 1, Run 1, Scenario 8.
* ##########################
  M583 Warning:
         The user supplied arterial average speed of 50.0
         will be used for all hours of the day.  100% of VMT
         has been assigned to the arterial/collector roadway
         type for all hours of the day and all vehicle types.
  M 48 Warning:
          there are no sales for vehicle class HDGV8b

 LEV phase-in data read from file MA_LEV2.D
                Calendar Year:  2007
                     Month:  July
                   Altitude:  Low
           Minimum Temperature:  68.0 (F)
           Maximum Temperature:  94.0 (F)
            Absolute Humidity:   75. grains/lb
           Fuel Sulfur Content:   30. ppm

           Exhaust I/M Program:  Yes
             Evap I/M Program:  Yes
                ATP Program:  Yes
             Reformulated Gas:  Yes

     Vehicle Type:     LDGV    LDGT12    LDGT34     LDGT      HDGV      LDDV      LDDT      HDDV       MC   All Veh
          GVWR:              <6000     >6000     (All)
                  ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
   VMT Distribution:   0.3652    0.3631    0.1427            0.0364    0.0007    0.0014    0.0864    0.0040    1.0000
 Fuel Economy (mpg):     24.1      18.6      14.3      17.1       9.9      30.0      18.3       7.2      50.0      16.5
  --------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
    Composite VOC :      0.535     0.417     0.496     0.439     0.454    0.430     0.348     0.318     3.43     0.476
    Composite CO  :      6.88      6.86      8.02      7.19      5.43     1.331     0.651     1.606     10.70    6.529
```

Table I-4 MOBILE6.2.03 Output Files

```
   Composite NOX :     0.532    0.608    0.930    0.699    3.018    1.094    0.795    9.428     1.34    1.479
   Composite CO2 :   368.4    476.9    621.7    517.8    897.3    339.7    556.1   1404.5    177.4   552.18
 ---------------------------------------------------------------------------------------------------------------
       Veh. Type:   GasBUS    URBAN    SCHOOL
                    ------   ------   ------
        VMT Mix:   0.0002   0.0009   0.0016
 Fuel Economy (mpg):     6.4      4.3      6.2
 ---------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
   Composite VOC :    0.421    0.251    0.397
   Composite CO  :     6.24    2.364    1.249
   Composite NOX :    4.161   14.469   10.116
   Composite CO2 :  1376.1   2350.6   1646.2
 ---------------------------------------------------------------------------------------------------------------
```

```
*******************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                                  *
* Input file: MA07PMO3.INP (file 1, run 1).                                   *
*******************************************************************************

* ##########################
* PM 10 - Idle Scenario - Summer (multiply g/mi by 2.5 mph to get g/hr)
* File 1, Run 1, Scenario 8.
* ##########################

                      Calendar Year:  2007
                             Month:  July
              Gasoline Fuel Sulfur Content:   30. ppm
               Diesel Fuel Sulfur Content:  350. ppm
                   Particle Size Cutoff: 10.00 Microns
                     Reformulated Gas:  Yes

    Vehicle Type:     LDGV   LDGT12   LDGT34     LDGT     HDGV     LDDV     LDDT     HDDV       MC   All Veh
         GVWR:           <6000    >6000    (All)
                ------   ------   ------   ------   ------   ------   ------   ------   ------   ------
 VMT Distribution:   0.3652   0.3631   0.1427           0.0364   0.0007   0.0014   0.0864   0.0040   1.0000
 ---------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
          Lead:   0.0000   0.0000   0.0000   0.0000   0.0000   ------   ------   ------   0.0000   0.0000
        GASPM:   0.0040   0.0040   0.0040   0.0040   0.0040   0.0497   ------   ------   ------   0.0205   0.0054
      ECARBON:   ------   ------   ------   ------   ------   ------   0.1194   0.0332   0.1532   ------   0.0134
      OCARBON:   ------   ------   ------   ------   ------   ------   0.0337   0.0478   0.0765   ------   0.0067
          SO4:   0.0005   0.0006   0.0006   0.0006   0.0011   0.0039   0.0063   0.0214   0.0002   0.0024
 Total Exhaust PM:   0.0046   0.0046   0.0046   0.0046   0.0509   0.1570   0.0873   0.2511   0.0207   0.0279
        Brake:   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125
         Tire:   0.0080   0.0080   0.0080   0.0080   0.0085   0.0080   0.0080   0.0247   0.0040   0.0094
      Total PM:   0.0251   0.0252   0.0252   0.0252   0.0719   0.1776   0.1079   0.2883   0.0372   0.0499
          SO2:   0.0067   0.0087   0.0114   0.0095   0.0164   0.0742   0.1215   0.3054   0.0033   0.0345
```

Table I-4 MOBILE6.2.03 Output Files

```
          NH3:   0.1015   0.1015   0.1015   0.1015   0.0451   0.0068   0.0068   0.0270   0.0113   0.0924
------------------------------------------------------------------------------------------------------------------------
      Veh. Type:   GasBUS    URBAN    SCHOOL
                   ------   ------   ------
       VMT Mix:   0.0002   0.0009   0.0016
------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
         Lead:   0.0000   ------   ------
        GASPM:   0.0470   ------   ------
      ECARBON:   ------   0.1821   0.1080
      OCARBON:   ------   0.1430   0.0848
          SO4:   0.0011   0.0358   0.0250
 Total Exhaust PM:   0.0481   0.3609   0.2178
        Brake:   0.0125   0.0125   0.0125
         Tire:   0.0120   0.0120   0.0120
     Total PM:   0.0727   0.3854   0.2424
          SO2:   0.0254   0.5111   0.3579
          NH3:   0.0451   0.0270   0.0270
------------------------------------------------------------------------------------------------------------------------

*##########################
* PM 10 - Summer 15 mph
* File 1, Run 1, Scenario 9.
*##########################

                    Calendar Year:  2007
                            Month:  July
          Gasoline Fuel Sulfur Content:   30. ppm
           Diesel Fuel Sulfur Content:  350. ppm
               Particle Size Cutoff: 10.00 Microns
                  Reformulated Gas:  Yes

    Vehicle Type:     LDGV   LDGT12   LDGT34     LDGT     HDGV     LDDV     LDDT     HDDV       MC   All Veh
         GVWR:            <6000    >6000    (All)
                 ------   ------   ------   ------   ------   ------   ------   ------   ------   ------
 VMT Distribution:   0.3652   0.3631   0.1427           0.0364   0.0007   0.0014   0.0864   0.0040   1.0000
------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
         Lead:   0.0000   0.0000   0.0000   0.0000   0.0000   ------   ------   ------   0.0000   0.0000
        GASPM:   0.0040   0.0040   0.0040   0.0040   0.0497   ------   ------   ------   0.0205   0.0054
      ECARBON:   ------   ------   ------   ------   ------   0.1194   0.0332   0.1532   ------   0.0134
      OCARBON:   ------   ------   ------   ------   ------   0.0337   0.0478   0.0765   ------   0.0067
          SO4:   0.0005   0.0006   0.0006   0.0006   0.0011   0.0039   0.0063   0.0214   0.0002   0.0024
 Total Exhaust PM:   0.0046   0.0046   0.0046   0.0046   0.0509   0.1570   0.0873   0.2511   0.0207   0.0279
        Brake:   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125
         Tire:   0.0080   0.0080   0.0080   0.0080   0.0085   0.0080   0.0080   0.0247   0.0040   0.0094
     Total PM:   0.0251   0.0252   0.0252   0.0252   0.0719   0.1776   0.1079   0.2883   0.0372   0.0499
          SO2:   0.0067   0.0087   0.0114   0.0095   0.0164   0.0742   0.1215   0.3054   0.0033   0.0345
          NH3:   0.1015   0.1015   0.1015   0.1015   0.0451   0.0068   0.0068   0.0270   0.0113   0.0924
------------------------------------------------------------------------------------------------------------------------
      Veh. Type:   GasBUS    URBAN    SCHOOL
                   ------   ------   ------
       VMT Mix:   0.0002   0.0009   0.0016
-
```

Table I-4 MOBILE6.2.03 Output Files

```
Composite Emission Factors (g/mi):
          Lead:   0.0000   ------   ------
         GASPM:   0.0470   ------   ------
       ECARBON:   ------   0.1821   0.1080
       OCARBON:   ------   0.1430   0.0848
           SO4:   0.0011   0.0358   0.0250
 Total Exhaust PM:   0.0481   0.3609   0.2178
         Brake:   0.0125   0.0125   0.0125
          Tire:   0.0120   0.0120   0.0120
      Total PM:   0.0727   0.3854   0.2424
           SO2:   0.0254   0.5111   0.3579
           NH3:   0.0451   0.0270   0.0270
-------------------------------------------------------------------------------------------------------------------------

*##########################
* PM 10 - Summer 20 mph
* File 1, Run 1, Scenario 10.
*##########################

                    Calendar Year:  2007
                            Month:  July
          Gasoline Fuel Sulfur Content:   30. ppm
           Diesel Fuel Sulfur Content:  350. ppm
               Particle Size Cutoff: 10.00 Microns
                  Reformulated Gas:  Yes

    Vehicle Type:     LDGV   LDGT12   LDGT34     LDGT     HDGV     LDDV     LDDT     HDDV      MC   All Veh
         GVWR:            <6000    >6000    (All)
                  ------   ------   ------   ------   ------   ------   ------   ------   ------   ------
 VMT Distribution:   0.3652   0.3631   0.1427           0.0364   0.0007   0.0014   0.0864   0.0040   1.0000
-------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
          Lead:   0.0000   0.0000   0.0000   0.0000   0.0000   ------   ------   ------   0.0000   0.0000
         GASPM:   0.0040   0.0040   0.0040   0.0040   0.0497   ------   ------   ------   0.0205   0.0054
       ECARBON:   ------   ------   ------   ------   ------   0.1194   0.0332   0.1532   ------   0.0134
       OCARBON:   ------   ------   ------   ------   ------   0.0337   0.0478   0.0765   ------   0.0067
           SO4:   0.0005   0.0006   0.0006   0.0006   0.0012   0.0039   0.0063   0.0214   0.0002   0.0024
 Total Exhaust PM:   0.0045   0.0046   0.0046   0.0046   0.0509   0.1570   0.0873   0.2511   0.0207   0.0279
         Brake:   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125
          Tire:   0.0080   0.0080   0.0080   0.0080   0.0085   0.0080   0.0080   0.0247   0.0040   0.0094
      Total PM:   0.0251   0.0252   0.0252   0.0252   0.0719   0.1776   0.1079   0.2883   0.0372   0.0499
           SO2:   0.0067   0.0087   0.0114   0.0095   0.0164   0.0742   0.1215   0.3054   0.0033   0.0345
           NH3:   0.1015   0.1015   0.1015   0.1015   0.0451   0.0068   0.0068   0.0270   0.0113   0.0924
-------------------------------------------------------------------------------------------------------------------------
      Veh. Type:   GasBUS    URBAN    SCHOOL
                  ------   ------   ------
       VMT Mix:   0.0002   0.0009   0.0016
-------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
          Lead:   0.0000   ------   ------
         GASPM:   0.0470   ------   ------
       ECARBON:   ------   0.1821   0.1080
       OCARBON:   ------   0.1430   0.0848
```

Table I-4 MOBILE6.2.03 Output Files

```
          SO4:   0.0011   0.0358   0.0250
 Total Exhaust PM:   0.0481   0.3609   0.2178
        Brake:   0.0125   0.0125   0.0125
         Tire:   0.0120   0.0120   0.0120
      Total PM:   0.0727   0.3854   0.2424
          SO2:   0.0254   0.5111   0.3579
          NH3:   0.0451   0.0270   0.0270
-------------------------------------------------------------------------------------------------------------------

*##########################
* PM 10 - Summer 25 mph
* File 1, Run 1, Scenario 11.
*##########################

                    Calendar Year:  2007
                         Month:  July
          Gasoline Fuel Sulfur Content:   30. ppm
           Diesel Fuel Sulfur Content:  350. ppm
               Particle Size Cutoff: 10.00 Microns
                 Reformulated Gas:  Yes

    Vehicle Type:     LDGV   LDGT12   LDGT34     LDGT     HDGV     LDDV     LDDT     HDDV      MC   All Veh
         GVWR:            <6000    >6000    (All)
                ------   ------   ------   ------   ------   ------   ------   ------   ------   ------
 VMT Distribution:   0.3652   0.3631   0.1427          0.0364   0.0007   0.0014   0.0864   0.0040   1.0000
-------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
         Lead:   0.0000   0.0000   0.0000   0.0000   0.0000   ------   ------   ------   0.0000   0.0000
        GASPM:   0.0041   0.0041   0.0040   0.0040   0.0497   ------   ------   ------   0.0205   0.0054
      ECARBON:   ------   ------   ------   ------   ------   0.1194   0.0332   0.1532   ------   0.0134
      OCARBON:   ------   ------   ------   ------   ------   0.0337   0.0478   0.0765   ------   0.0067
          SO4:   0.0004   0.0005   0.0005   0.0005   0.0013   0.0039   0.0063   0.0214   0.0001   0.0023
 Total Exhaust PM:   0.0045   0.0046   0.0046   0.0046   0.0510   0.1570   0.0873   0.2511   0.0206   0.0278
        Brake:   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125
         Tire:   0.0080   0.0080   0.0080   0.0080   0.0085   0.0080   0.0080   0.0247   0.0040   0.0094
      Total PM:   0.0250   0.0251   0.0251   0.0251   0.0721   0.1776   0.1079   0.2883   0.0372   0.0498
          SO2:   0.0067   0.0087   0.0115   0.0095   0.0164   0.0742   0.1215   0.3054   0.0033   0.0345
          NH3:   0.1015   0.1015   0.1015   0.1015   0.0451   0.0068   0.0068   0.0270   0.0113   0.0924
-------------------------------------------------------------------------------------------------------------------
      Veh. Type:   GasBUS    URBAN    SCHOOL
                ------   ------   ------
       VMT Mix:   0.0002   0.0009   0.0016
-------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
         Lead:   0.0000   ------   ------
        GASPM:   0.0470   ------   ------
      ECARBON:   ------   0.1821   0.1080
      OCARBON:   ------   0.1430   0.0848
          SO4:   0.0012   0.0358   0.0250
 Total Exhaust PM:   0.0482   0.3609   0.2178
        Brake:   0.0125   0.0125   0.0125
         Tire:   0.0120   0.0120   0.0120
      Total PM:   0.0728   0.3854   0.2424
          SO2:   0.0254   0.5111   0.3579
```

Table I-4 MOBILE6.2.03 Output Files

```
          NH3:   0.0451   0.0270   0.0270
 ---------------------------------------------------------------------------------------------------------------------

 *#########################
 * PM 10 - Summer 30 mph
 * File 1, Run 1, Scenario 12.
 *#########################

                      Calendar Year:  2007
                          Month:  July
            Gasoline Fuel Sulfur Content:   30. ppm
             Diesel Fuel Sulfur Content:  350. ppm
                 Particle Size Cutoff: 10.00 Microns
                   Reformulated Gas:  Yes

     Vehicle Type:     LDGV   LDGT12   LDGT34     LDGT     HDGV     LDDV     LDDT     HDDV      MC   All Veh
          GVWR:           <6000    >6000    (All)
                  ------   ------   ------   ------   ------   ------   ------   ------   ------   ------
  VMT Distribution:   0.3652   0.3631   0.1427           0.0364   0.0007   0.0014   0.0864   0.0040   1.0000
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
           Lead:   0.0000   0.0000   0.0000   0.0000   0.0000   ------   ------   ------   0.0000   0.0000
          GASPM:   0.0041   0.0041   0.0041   0.0041   0.0496   ------   ------   ------   0.0205   0.0054
        ECARBON:   ------   ------   ------   ------   ------   0.1194   0.0332   0.1532   ------   0.0134
        OCARBON:   ------   ------   ------   ------   ------   0.0337   0.0478   0.0765   ------   0.0067
           SO4:   0.0003   0.0005   0.0005   0.0005   0.0015   0.0039   0.0063   0.0214   0.0001   0.0023
  Total Exhaust PM:   0.0044   0.0046   0.0046   0.0046   0.0511   0.1570   0.0873   0.2511   0.0206   0.0278
          Brake:   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125
           Tire:   0.0080   0.0080   0.0080   0.0080   0.0085   0.0080   0.0080   0.0247   0.0040   0.0094
        Total PM:   0.0250   0.0251   0.0251   0.0251   0.0722   0.1776   0.1079   0.2883   0.0371   0.0498
           SO2:   0.0068   0.0088   0.0115   0.0095   0.0163   0.0742   0.1215   0.3054   0.0033   0.0345
           NH3:   0.1015   0.1015   0.1015   0.1015   0.0451   0.0068   0.0068   0.0270   0.0113   0.0924
 ---------------------------------------------------------------------------------------------------------------------
       Veh. Type:   GasBUS    URBAN    SCHOOL
                  ------   ------   ------
        VMT Mix:   0.0002   0.0009   0.0016
 ---------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
           Lead:   0.0000   ------   ------
          GASPM:   0.0470   ------   ------
        ECARBON:   ------   0.1821   0.1080
        OCARBON:   ------   0.1430   0.0848
           SO4:   0.0014   0.0358   0.0250
  Total Exhaust PM:   0.0484   0.3609   0.2178
          Brake:   0.0125   0.0125   0.0125
           Tire:   0.0120   0.0120   0.0120
        Total PM:   0.0729   0.3854   0.2424
           SO2:   0.0253   0.5111   0.3579
           NH3:   0.0451   0.0270   0.0270
 ---------------------------------------------------------------------------------------------------------------------

 *#########################
 * PM 10 - Summer 35 mph
 * File 1, Run 1, Scenario 13.
```

Table I-4 MOBILE6.2.03 Output Files

```
*##########################

                    Calendar Year:  2007
                         Month:  July
          Gasoline Fuel Sulfur Content:   30. ppm
           Diesel Fuel Sulfur Content:  350. ppm
              Particle Size Cutoff: 10.00 Microns
                Reformulated Gas:  Yes

    Vehicle Type:     LDGV   LDGT12   LDGT34     LDGT     HDGV     LDDV     LDDT     HDDV       MC   All Veh
         GVWR:           <6000    >6000    (All)
                ------  ------  ------  ------  ------  ------  ------  ------  ------  ------
 VMT Distribution:   0.3652   0.3631   0.1427           0.0364   0.0007   0.0014   0.0864   0.0040   1.0000
-------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
          Lead:   0.0000   0.0000   0.0000   0.0000   0.0000   ------   ------   ------   0.0000   0.0000
         GASPM:   0.0041   0.0041   0.0041   0.0041   0.0496   ------   ------   ------   0.0205   0.0055
       ECARBON:   ------   ------   ------   ------   ------   0.1194   0.0332   0.1532   ------   0.0134
       OCARBON:   ------   ------   ------   ------   ------   0.0337   0.0478   0.0765   ------   0.0067
          SO4:   0.0002   0.0004   0.0004   0.0004   0.0016   0.0039   0.0063   0.0214   0.0001   0.0022
 Total Exhaust PM:   0.0044   0.0045   0.0045   0.0045   0.0512   0.1570   0.0873   0.2511   0.0206   0.0278
         Brake:   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125
          Tire:   0.0080   0.0080   0.0080   0.0080   0.0085   0.0080   0.0080   0.0247   0.0040   0.0094
      Total PM:   0.0249   0.0251   0.0251   0.0251   0.0723   0.1776   0.1079   0.2883   0.0371   0.0498
          SO2:   0.0068   0.0088   0.0115   0.0095   0.0163   0.0742   0.1215   0.3054   0.0033   0.0345
          NH3:   0.1015   0.1015   0.1015   0.1015   0.0451   0.0068   0.0068   0.0270   0.0113   0.0924
-------------------------------------------------------------------------------------------------------------------------
      Veh. Type:   GasBUS    URBAN    SCHOOL
                ------   ------   ------
       VMT Mix:   0.0002   0.0009   0.0016
-------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
          Lead:   0.0000   ------   ------
         GASPM:   0.0469   ------   ------
       ECARBON:   ------   0.1821   0.1080
       OCARBON:   ------   0.1430   0.0848
          SO4:   0.0015   0.0358   0.0250
 Total Exhaust PM:   0.0485   0.3609   0.2178
         Brake:   0.0125   0.0125   0.0125
          Tire:   0.0120   0.0120   0.0120
      Total PM:   0.0730   0.3854   0.2424
          SO2:   0.0253   0.5111   0.3579
          NH3:   0.0451   0.0270   0.0270
-------------------------------------------------------------------------------------------------------------------------

*##########################
* PM 10 - Summer 50 mph
* File 1, Run 1, Scenario 14.
*##########################

                    Calendar Year:  2007
                         Month:  July
          Gasoline Fuel Sulfur Content:   30. ppm
           Diesel Fuel Sulfur Content:  350. ppm
```

Table I-4 MOBILE6.2.03 Output Files

```
                Particle Size Cutoff: 10.00 Microns
                  Reformulated Gas: Yes

    Vehicle Type:     LDGV   LDGT12   LDGT34     LDGT     HDGV     LDDV     LDDT     HDDV       MC   All Veh
         GVWR:          <6000    >6000    (All)
                ------   ------   ------   ------   ------   ------   ------   ------   ------   ------
 VMT Distribution:  0.3652   0.3631   0.1427           0.0364   0.0007   0.0014   0.0864   0.0040   1.0000
-------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
          Lead:  0.0000   0.0000   0.0000   0.0000   0.0000   ------   ------   ------   0.0000   0.0000
         GASPM:  0.0041   0.0041   0.0041   0.0041   0.0496   ------   ------   ------   0.0205   0.0055
       ECARBON:  ------   ------   ------   ------   ------   0.1194   0.0332   0.1532   ------   0.0134
       OCARBON:  ------   ------   ------   ------   ------   0.0337   0.0478   0.0765   ------   0.0067
           SO4:  0.0002   0.0004   0.0004   0.0004   0.0016   0.0039   0.0063   0.0214   0.0001   0.0022
 Total Exhaust PM:  0.0044   0.0045   0.0045   0.0045   0.0512   0.1570   0.0873   0.2511   0.0206   0.0278
         Brake:  0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125   0.0125
          Tire:  0.0080   0.0080   0.0080   0.0080   0.0085   0.0080   0.0080   0.0247   0.0040   0.0094
      Total PM:  0.0249   0.0251   0.0251   0.0251   0.0723   0.1776   0.1079   0.2883   0.0371   0.0498
           SO2:  0.0068   0.0088   0.0115   0.0095   0.0163   0.0742   0.1215   0.3054   0.0033   0.0345
           NH3:  0.1015   0.1015   0.1015   0.1015   0.0451   0.0068   0.0068   0.0270   0.0113   0.0924
-------------------------------------------------------------------------------------------------------------------------
      Veh. Type:  GasBUS    URBAN    SCHOOL
                  ------   ------   ------
       VMT Mix:  0.0002   0.0009   0.0016
-------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
          Lead:  0.0000   ------   ------
         GASPM:  0.0469   ------   ------
       ECARBON:  ------   0.1821   0.1080
       OCARBON:  ------   0.1430   0.0848
           SO4:  0.0015   0.0358   0.0250
 Total Exhaust PM:  0.0485   0.3609   0.2178
         Brake:  0.0125   0.0125   0.0125
          Tire:  0.0120   0.0120   0.0120
      Total PM:  0.0730   0.3854   0.2424
           SO2:  0.0253   0.5111   0.3579
           NH3:  0.0451   0.0270   0.0270
-------------------------------------------------------------------------------------------------------------------------
```

Fuel Storage and Handling

As in previous years, volatile organic compounds (VOC) emissions from fuel storage and handling were calculated using methods based on EPA's AP-42[2] document. Calculations are made to account for evaporative emissions from breathing losses, working losses, and spillage from above-ground storage tanks, underground storage tanks, and aircraft refueling. In 2003, additional information became available on the fire training fuel, Tek-Flame®. Emissions of VOCs from this fuel were estimated by EDMS. Table I-5 presents Logan Airport's fuel throughput by category.

Table I-5 Fuel Throughput by Fuel Category (gallons)

Fuel Category	1999	2000	2001	2002	2003	2004	2005	2006	2007
Jet Fuel	354,095,516	441,901,932	416,748,819	358,190,362	319,439,910	373,996,141	368,645,392	364,450,864	367,585,187
Fire Training Fuel[1]	NA	NA	NA	NA	13,719	12,227	8,105	5,000	8,631
Aviation Gas	99,726	90,922	60,691	35,111	32,515	34,717	52,487	35,098	29,067
Auto Gas	7,200,000	7,569,206	6,181,472	5,754,740	5,436,322	5,803,442	5,903,424	6,028,931	6,022,237
Diesel	768,106	839,751	1,239,904	1,067,847	1,030,185	1,078,665	1,567,688	1,164,493	1,141,337
Heating Oil No.2	480,733	494,500	582,283	340,492	370,903	381,852	367,899	259,768	423,181
Heating Oil No.6	1,600,893	1,555,527	1,641,693	1,079,283	1,122,975	2,940,752	3,098,126	1,396,529	1,073,260

Source: Massport, 2008.
1 Tek-Flame® Fuel was not used until 2003. Jet A Fuel was used prior to 2003.
NA Not available.

2 Compilation of Air Pollutant Emission Factors, AP-42, Office of Air Quality Planning and Standards, EPA, Fifth Edition,1995.

Stationary Sources

Stationary sources include the Central Heating and Cooling Plant, emergency generators, snow melters, and boilers. Emission factors from EPA's AP-42 were combined with the actual 2007 fuel throughput of the stationary sources to obtain emissions of VOCs, NO_X, CO, and $PM_{10}/PM_{2.5}$.

Title V of the 1990 CAA Amendments requires facilities with air emissions to document their emissions and obtain a single permit combining all sources. The permitting program ensures that all emission sources are accounted for, the proper permits have been received, and permit conditions are being followed. A Title V Air Operating Permit covers all of the stationary sources at Logan Airport including boilers, emergency generators, snow melters, cooling towers, paint booths, deicing facilities, and storage tanks. Table I-6 presents Logan Airport's stationary source fuel throughput by fuel category.

Table I-6 Stationary Source Fuel Throughput by Fuel Category (gallons)

Fuel Category	1999	2000	2001	2002	2003	2004	2005	2006	2007[3]
Natural Gas (ft^3)	183,943,000	283,720,049	199,500,000	268,359,282	201,714,114	62,610,000	92,460,000	112,390,000	338,430,000
Heating Oil No. 2	480,733	494,500	582,283	340,492	370,903	381,852	367,899	259,768	423,181
Heating Oil No. 6	1,600,893	1,555,527	1,641,693	1,079,283	1,122,975	2,940,752	3,098,126	1,396,529	1,073,260
Diesel Fuel[1]	57,441	NA	NA	NA	NA	67,198	77,848	77,848	258,606
Fire Training Fuel[2]	23,000	NA	NA	NA	13,719	12,227	8,105	5,000	8,631

NA Not available.
Source: Massport, 2008.
1 Diesel fuel was from the stationary snow melter usage. For 2007, portable snowmelter usage was also included.
2 Fire Training Fuel used in 1999 was Jet A Fuel while in 2003 through 2007 it was Tek-Flame®.
3 2007 was an unusually severe winter season.

1993 Through 2003 Emissions Inventories

Tables I-7 through I-9 contain the 1993 through 2003 Emissions Inventory summary tables for Logan Airport.

Table I-7 Estimated VOC Emissions (in kg/day) at Logan Airport[1]

	1993	1994	1995	1996	1997	1998	1999[2]	2000	2001	2002	2003
Aircraft/GSE Model	Logan Dispersion Modeling System (LDMS)					EDMS v3.22	EDMS v4.21	EDMS v4.03		EDMS v4.11	
Motor Vehicle Model	MOBILE5a					MOB5a_h	MOB6.2.03	MOBILE 6.0			MOB6.2.01
Aircraft Sources											
Air carriers	1,958	1,554	1,407	1,390	1,227	736	653	514	374	248	208
Commuter aircraft	943	543	531	622	498	154	196	140	113	75	95
Cargo aircraft	89	244	236	214	207	43	318	207	149	127	94
General aviation	51	48	36	24	27	13	141	42	43	52	61
Total aircraft sources	3,041	2,389	2,210	2,250	1,959	946	1,308	903	680	502	458
Ground Service Equipment[3]	636	533	521	497	530	145	243	153	143	247[4]	227
Motor Vehicles											
Ted Williams Tunnel through-traffic	NA	NA	NA	NA	NA	NA	15	12	10	9	0[5]
Parking/curbside	173	148	127	102	102	118	101	89	77	51	45
On-airport vehicles[6]	238	215	179	223	205	258	256	206	170	152	135
Total motor vehicle sources	411	363	306	325	307	376	372	307	257	212	180
Other Sources											
Fuel storage/handling	408	434	318	356	381	372	352	412	372	329	297
Miscellaneous sources[7]	5	5	5	6	6	2	16	2	2	2	3
Total other sources	413	439	323	362	387	374	368	414	374	331	300
Total Airport Sources	4,501	3,724	3,360	3,434	3,183	1,841	2,291	1,777	1,454	1,292	1,165

kg/day kilograms per day. 1 kg/day is approximately equivalent to 0.40234 tons per year (tpy).
NA Not available.
MOB MOBILE model for motor vehicle emissions (MOB5a_h=MOBILE5a_h, MOB6.2=MOBILE6.2 version .01 or version .03)
1 The emissions inventory for 1990 is shown in the 2005 EDR. Emission inventories for 1991 and 1992 were not prepared.
2 Year 1999 emissions were last re-calculated using EDMS v4.21 in the 2004 ESPR Air Quality Analysis.
3 Beginning in 1996 and later, emissions include vehicles and equipment converted to alternative fuels.
4 Updates to the EDMS resulted in an increase of GSE NOx emissions between 2001 and 2002 as the result of new emission factors from the NONROAD emission factor database.
5 Due to the new roadway configuration and opening of the Ted Williams Tunnel there was no Ted Williams Tunnel through-traffic at Logan Airport beginning in 2003.
6 1999 through 2003 emissions inventory include reductions attributable to CNG shuttle buses.
7 Includes the Central Heating and Cooling Plant, emergency electricity generation, and other stationary sources. Fire Training emissions were included in 1999 and 2003. Diesel snow melter usage was added in 1999.

Table I-8 Estimated NO_X Emissions (in kg/day) at Logan Airport[1]

	1993	1994	1995	1996	1997	1998	1999[2]	2000	2001	2002	2003
Aircraft/GSE Model	Logan Dispersion Modeling System (LDMS)					EDMS v3.22	EDMS v4.21	EDMS v4.03		EDMS v4.11	
Motor Vehicle Model	MOBILE5a					MOB5a_h	MOB6.2.03	MOBILE 6.0			MOB6.2.01
Aircraft Sources											
Air carriers	4,271	4,317	3,861	3,781	4,150	4,471	4,183	4,202	3,707	2,721	2,479
Commuter aircraft	202	158	192	137	159	203	166	125	233	208	185
Cargo aircraft	213	257	332	363	262	254	286	284	267	246	213
General aviation	13	13	17	18	21	5	12	49	34	38	45
Total aircraft sources	4,699	4,745	4,402	4,389	4,592	4,933	4,647	4,660	4,241	3,212	2,922
Ground Service Equipment[3]	722	617	607	588	622	317	444	333	305	322[4]	291
Motor Vehicles											
Ted Williams Tunnel through-traffic	NA	NA	NA	NA	NA	NA	28	26	22	20	0[5]
Parking/curbside	25	24	24	24	24	37	39	52	46	32	28
On-airport vehicles[6]	240	239	229	257	244	372	449	425	369	341	302
Total motor vehicle sources	265	263	253	281	268	409	516	503	437	393	330
Other Sources											
Fuel storage/handling[7]	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous sources[8]	278	330	320	275	244	284	165	211	185	175	151
Total other sources	278	330	320	275	244	284	165	211	185	175	151
Total Airport Sources	5,964	5,955	5,582	5,533	5,726	5,943	5,772	5,707	5,168	4,103	3,694

kg/day kilograms per day. 1 kg/day is approximately equivalent to 0.40234 tons per year (tpy).
NA Not available.
MOB MOBILE model for motor vehicle emissions (MOB5a_h=MOBILE5a_h, MOB6.2=MOBILE6.2 version .01 or version .03)
1 The emissions inventory for 1990 is shown in the 2005 EDR. Emission inventories for 1991 and 1992 were not prepared.
2 Year 1999 emissions were last re-calculated using EDMS v4.21 in the 2004 ESPR Air Quality Analysis.
3 Beginning in 1996 and later, emissions include vehicles and equipment converted to alternative fuels.
4 Updates to the EDMS resulted in an increase of GSE NOx emissions between 2001 and 2002 as the result of new emission factors from the NONROAD emission factor database.
5 Due to the new roadway configuration and opening of the Ted Williams Tunnel there was no Ted Williams Tunnel through-traffic at Logan Airport beginning in 2003.
6 1999 through 2003 emissions inventory include reductions attributable to CNG shuttle buses.
7 Fuel storage and handling facilities are not sources of NOx emissions.
8 Includes the Central Heating and Cooling Plant, emergency electricity generation, and other stationary sources. Fire Training emissions were included in 1999 and 2003. Diesel snow melter usage was added in 1999.

Table I-9 Estimated CO Emissions (in kg/day) at Logan Airport[1]

	1993	1994	1995	1996	1997	1998	1999[2]	2000	2001	2002	2003
Aircraft/GSE Model	Logan Dispersion Modeling System (LDMS)					EDMS 3.22	EDMS v4.21	EDMS v4.03		EDMS v4.11	
Motor Vehicle Model	MOBILE5a					MOB5a_h	MOB6.2.03	MOBILE 6.0			MOB6.2.01
Aircraft Sources											
Air carriers	5,663	4,660	4,691	4,812	4,698	3,079	3,754	2,994	2,475	2,156	2,128
Commuter aircraft	1,309	927	934	859	770	482	1,404	1,188	1,072	783	846
Cargo aircraft	344	572	598	580	514	218	503	400	323	285	209
General aviation	353	356	339	549	654	269	940	295	407	256	276
Total aircraft sources	7,669	6,515	6,562	6,800	6,636	4,048	6,601	4,876	4,277	3,480	3,459
Ground Service Equipment[3]	7,482	6,187	6,029	5,740	6,098	5,113	4,532	5,335	5,193	5,170	4,758
Motor Vehicles											
Ted Williams Tunnel through-traffic	NA	NA	NA	NA	NA	NA	151	133	121	112	0[4]
Parking/curbside	952	820	650	644	586	772	437	495	440	295	253
On-airport vehicles[5]	1,575	1,451	1,087	1,514	1,283	1,883	2,547	2,245	2,001	1,872	1,685
Total motor vehicle sources	2,527	2,271	1,737	2,158	1,869	2,655	3,135	2,873	2,562	2,279	1,938
Other Sources											
Fuel storage/handling[6]	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous sources[7]	26	30	29	39	37	37	168	27	24	23	22
Total other sources	26	30	29	39	37	37	168	27	24	23	22
Total Airport Sources	17,704	15,003	14,357	14,737	14,640	11,853	14,436	13,111	12,056	10,952	10,177

kg/day kilograms per day. 1 kg/day is approximately equivalent to 0.40234 tons per year (tpy).
NA Not available.
MOB MOBILE model for motor vehicle emissions (MOB5a_h=MOBILE5a_h, MOB6.2=MOBILE6.2 version .01 or version .03)
1 The emissions inventory for 1990 is shown in the 2005 EDR. Emission inventories for 1991 and 1992 were not prepared.
2 Year 1999 emissions were last re-calculated using EDMS v4.21 in the 2004 ESPR Air Quality Analysis.
3 Beginning in 1996 and later, emissions include vehicles and equipment converted to alternative fuels.
4 Due to the new roadway configuration and opening of the Ted Williams Tunnel there was no Ted Williams Tunnel through-traffic at Logan Airport beginning in 2003.
5 1999 through 2003 emission inventory include reductions attributable to CNG shuttle buses.
6 Fuel storage and handling facilities are not sources of CO emissions.
7 Includes the Central Heating and Cooling Plant, emergency electricity generation, and other stationary sources. Fire Training emissions were included in 1999 and 2003. Diesel snow melter usage was added in 1999.

Greenhouse Gas Emissions Inventory

The Massachusetts Executive Office of Energy and Environmental Affairs (EEA) has published a *Final Greenhouse Gas (GHG) Emissions Policy and Protocol*.[3] These guidelines require that certain projects undergoing review under the Massachusetts Environmental Policy Act (MEPA) shall (1) quantify the GHG emissions generated by proposed projects and (2) identify measures to avoid, minimize, or mitigate such emissions.[4] Even though the *2007 EDR* does not assess any proposed projects and is therefore not subject to the GHG policy, Massport has voluntarily prepared an emission inventory of GHG emissions directly and indirectly associated with Logan Airport.

For this initial assessment, GHG emissions are quantified for the year 2007 and include aircraft, ground support equipment (GSE) auxiliary power units (APU), motor vehicles, a variety of stationary sources as well as a electricity usage. This work was accomplished following the EEA guidelines and uses widely-accepted emission factors that are considered appropriate for this application, including ISO (International Organization for Standardization) New England electricity-based values.

Methodology

For airports, GHG emissions are calculated in much the same way criteria pollutants[5] are calculated - and that is through the use of input data such as activity levels or material throughput rates (i.e., fuel usage, vehicle miles traveled (VMT), electrical consumption) that are applied to appropriate emission factors (i.e., in units of GHG emissions per gallons of fuel).

In this case, the input data were either based on Massport records, or data and information derived from the latest version of the Federal Aviation Administration (FAA) Emissions and Dispersion Modeling System (EDMS v5.0.2). The year 2007 was used for this analysis and Table I-10 summarizes these data and information.

It should be noted that the U.S. Department of Transportation, Transportation Research Board (TRB) is presently developing unified methods for preparing airport-related GHG emission inventories.[6] These new guidelines are expected to be published in late 2008 and may have an effect on how future inventories for Logan Airport are computed.

3 MEPA *Greenhouse Gas Emissions Policy and Protocol*, Massachusetts Executive Office of Energy and Environmental Affairs, effective October 31, 2007.
4 These GHG are comprised primarily of carbon dioxide (CO_2), methane (CH_4), nitrous oxides (N_2O), and three groups of fluorinated gases (i.e., sulfur hexafluoride [SF_6], hydrofluorocarbons [HFCs], and perfluorocarbons [PFCs]). GHG emission sources associated with airports are generally limited to CO_2, CH_4, and N_2O.
5 Criteria pollutans are polluants for which there are National Ambient Air Quality Standards (i.e., carbon monoxide, sulfur dioxide, nitrogen dioxide, etc.).
6 Transportation Research Board, Airport Cooperative Research Panel, ACRP 02-06, Draft Guidebook on Preparing Airport Greenhouse Gas (GHG) Emissions Inventories (in production). See www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=1584 for more information.

Table I-10 Logan GHG Inventory Input Data and Information[1]

Activity	Fuel Type	Usage	Units	Source
Aircraft Sources (Direct)				
Aircraft Taxi	Jet A[2]	23,232,136	gallons	EDMS v5.0.2
	AvGas[3]	1,837	gallons	EDMS v5.0.2
Engine Startup	Jet A	258,479	gallons	EDMS v5.0.2
Aircraft Sources (Indirect)				
Aircraft LTO[4] minus taxi	Jet A[2]	18,372,558	gallons	EDMS v5.0.2
	AvGas[3]	1,453	gallons	EDMS v5.0.2
Ground Support Equipment				
GSE	Diesel	672,695	gallons	Massport
	Gasoline	620,759	gallons	Massport
	Propane	1,109,210	gallons	EDMS v5.0.2
	CNG	4,115	ft^3	EDMS v5.0.2
APU	Jet A	1,090,437	gallons	EDMS v5.0.2
Motor Vehicles (Direct)				
On-airport Vehicles	Composite[5]	69,001,048	VMT	Massport
On-airport Parking/Curbsides	Composite[5]	1,153,174	Idle hours	Massport
On-airport Buses	CNG	1,007,540	VMT	Massport
Motor Vehicles (Indirect)				
Off-airport Vehicles	Composite[5]	145,964,892	VMT	Massport
Stationary and Portable Sources				
Boilers	No 2 Oil	423,181	gallons	Massport
	No 6 Oil	1,073,260	gallons	Massport
	Natural Gas	338.43	million ft^3	Massport
Generators, Snowmelters, etc	Diesel/ULSD	278,409	gallons	Massport
Fire Training Facility	Tekflame	8,631	gallons	Massport
Electrical Consumption	-	199,238,117	kWh	Massport

Notes: APU – Auxiliary power units; CNG – compressed natural gas; GSE – ground support equipment; kWh – kilowatt hours; VMT – vehicle miles traveled; ULSD – ultra low sulfur diesel.

1 Based on 2007 activity levels and conditions.

2 Jet A density of 6.6 pounds per gallon.

3 AvGas density of 5.9 pounds per gallon.

4 The LTO (landing and take-off operation) includes landing, taxi-in, taxi-out, take-off, and up to an altitude of 2,320 feet.

5 Composite means gasoline and diesel-fueled motor vehicles.

Emission factors were obtained from the U.S. Energy Information Administration, the International Panel on Climate Change (IPCC), and the U.S. Environmental Protection Agency (EPA).[7,8,9] Table I-11 presents these emission factors for CO_2, N_2O, and CH_4.

Table I-11 GHG Emission Factors

Sources	Fuel	CO_2	N_2O	CH_4	Units
Aircraft[1]	Jet A	21.095	0.000188	0.00052	lb/gallon
	AvGas	18.355	0.000188	0.00052	lb/gallon
Ground Support Equipment/	Diesel	22.384	0.0002	0.00053	lb/gallon
Auxiliary Power Units[1]	Gasoline	19.564	0.0002	0.00055	lb/gallon
	CNG	120.593	0.0002	0.00020	lb/1000 ft^3
	Propane	12.669	2.30E-07	0.000003	lb/gallon
	Jet A	21.095	0.000188	0.00052	lb/gallon
Motor Vehicles[2]	Composite	369	0.005	0.024	g/mile
	Composite	921	0.0125	0.263	g/hour
	CNG	2,199	0.168	12.05	g/mile
Stationary and Portable[1]	No 2 Oil	22.384	0.000193	0.000534	lb/gallon
	No 6 Oil	26.033	0.000208	0.000225	lb/gallon
	Natural Gas	120.593	0.0002	0.0002	lb/1000 ft^3
	ULSD	22.384	0.000193	0.000534	lb/gallon
Fire Training Facility[1]	Tekflame[3]	12.669	2.30E-07	0.000003	lb/gallon
Electrical Consumption[4]	-	0.98	0.0000146	0.0000207	lb/kW-hr

Notes: CH_4 – methane; CNG – compressed natural gas; CO_2 – carbon dioxide; g- grams; kWhr – kilowatt hour; lb – pound; N_20 – nitrous oxides.

1 Energy Information Administration, www.eia.doe.gov/oiaf/1605/coefficients.html.
2 Environmental Protection Agency, MOBILE6.2 Emissions Model and Volume 2 of the 2006 IPCC Guidelines for National Greenhouse Gas Inventories
3 As propane
4 Energy Information Administration, www.eia.doe.gov/oiaf/1605/e-factor.html.

7 U.S. Energy Information Administration, *Voluntary Reporting of Greenhouse Gases Program Fuel and Energy Source Codes and Emission Coefficients,* www.eia.doe.gov/oiaf/1605/coefficients.html
8 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2, 2006, www.ipcc-nggip.iges.or.jp/public/gl/invs5.htm
9 U.S. Environmental Protection Agency, MOBILE6.2 Emissions Model, www.epa.gov/otaq/m6.htm

Results

Table I-12 presents the results of the 2007 GHG emissions inventory for Logan Airport by emission source (i.e., aircraft, GSE, motor vehicles) and compound (i.e., CO_2, N_20, CH_4).

Table I-12 GHG Emissions (MMT CO_2 Eq)[1]

Activity	CO_2	N_2O	CH_4	Total
Aircraft Sources				
Direct[2]	0.22	<0.01	<0.01	0.22
Indirect[3]	0.18	<0.01	<0.01	0.18
Aircraft Support Equipment				
GSE	0.07	<0.01	<0.01	0.07
APU	0.01	<0.01	<0.01	0.01
Motor Vehicles				
Direct[2]	0.03	<0.01	<0.01	0.03
Indirect[3]	0.05	<0.01	<0.01	0.05
Stationary Sources				
Boilers	0.04	<0.01	<0.01	0.04
Generators, Snowmelters, etc.	<0.01	<0.01	<0.01	<0.01
Fire Training Facility	<0.01	<0.01	<0.01	<0.01
Electrical Consumption	0.09	<0.01	<0.01	0.09

1 Units expressed as million metric tons of CO_2 equivalent (MMT CO_2 Eq)[2].
1 metric ton = 1.1 short tons.

2 Direct emissions include those that are generated on the airport site, and, for aircraft, within the engine startup and taxi modes.

3 Indirect emissions include those that are generated off the airport site and, for aircraft, up to the limits of the landing/take-off (LTO) cycle. The LTO cycle includes all operations that occur up to an altitude of 2,320 feet.

Table I-13 further summarizes the GHG emissions inventory and segregates them into two different categories: (1) "direct" and (2) "indirect" emissions. Direct emissions comprise those that are generated on the airport site and, for aircraft, include engine startup and ground-based taxi/delay mode. Indirect emissions are those that occur off the airport site and, for aircraft, up to the limits of the LTO cycle. These emissions are also compared to GHG emission totals for Massachusetts.

Table I-13 Logan Airport GHG Emissions Compared to Massachusetts Totals[1,2]

	CO_2	N_2O	CH_4	Totals
Logan Direct + Indirect Emissions[3]	0.69	<0.01	<0.01	0.69
Massachusetts[4]	87.0	1.4	1.0	89.4
Percent of Logan Airport to Massachusetts[5]				<1%

1 Units expressed as million metric tons of CO_2 equivalents (MMT CO_2 Eq)
2 1 metric ton = 1.1 short tons.
3 Direct emissions include those that are generated on the airport site and indirect emissions are a combination of emissions of off-site motor vehicle, aircraft within the LTO cycle and electrical consumption.v
4 Climate Analysis Indicators Tool (CAIT US) Version 2.0. (Washington, DC: World Resources Institute, 2008)
5 Percentages represent the relative amount Logan-related emissions compared to the state totals.

J

Water Quality/ Environmental Compliance and Management

This appendix provides detailed information in support of *Chapter 8, Water Quality/ Environmental Compliance and Management:*

- Table J-1 NPDES Permit Stormwater Outfall Monitoring Requirements
- Table J-2 Logan Airport 2007 Stormwater Outfalls Monitoring Results – First through Third Quarters
- Table J-3 Logan Airport 2007 Stormwater Outfalls Monthly Monitoring Results for Fourth Quarter
- Table J-4 Logan Airport 2007 Quarterly Monitoring Results for Fourth Quarter – North, West and Maverick Street Stormwater Outfalls
- Table J-5 Logan Airport 2007 Quarterly Monitoring Results for Fourth Quarter – Northwest Stormwater Outfall
- Table J-6 History of Logan Airport Stormwater Outfall NPDES Water Quality Monitoring Results – 1993 to 2006
- Table J-7 History of Logan Airport Oil and Hazardous Material Spills and Jet Fuel Handling – 1990 to 2007
- Table J-8 Type and Quantity of Oil and Hazardous Material Spills at Logan Airport – 1999 to 2007
- EnviroNews Issue No. 28, Quarter I – 2007
  Issue No. 29, Quarter II – 2007
  Issue No. 30, Quarter III – 2007
  Issue No. 31, Quarter IV – 2007

Table J-1 NPDES Permit Stormwater Outfall Monitoring Requirements

	North Outfall 001		West Outfall 002		Maverick Outfall 003	
Monitoring Event	Field Measurement	Laboratory Analysis	Field Measurement	Laboratory Analysis	Field Measurement	Laboratory Analysis
Monthly Dry Weather	Not Required	Oil and Grease TSS[1] Benzene Surfactant Fecal Coliform Enterococcus	Not Required	Oil and Grease TSS[1] Benzene Surfactant Fecal Coliform Enterococcus	Not Required	Oil and Grease TSS[1] Benzene Surfactant Fecal Coliform Enterococcus
Monthly Wet Weather	pH Flow Rate[6]	Oil and Grease TSS[1] Benzene[2] Surfactant Fecal Coliform Enterococcus	pH Flow Rate[6]	Oil and Grease TSS[1] Benzene[2] Surfactant Fecal Coliform Enterococcus	pH Flow Rate[6]	Oil and Grease TSS[1] Benzene[2] Surfactant Fecal Coliform Enterococcus
Quarterly Wet Weather	pH Flow Rate[6]	PAHs[3]: - Benzo(a)anthracene - Benzo(a)pyrene - Benzo(b)fluoranthene - Benzo(k)fluoranthene - Chrysene -Dibenzo(a,h)anthracene - Indeno(1,2,3-cd)pyrene - Naphthalene	pH Flow Rate[6]	PAHs[3]: - Benzo(a)anthracene - Benzo(a)pyrene - Benzo(b)fluoranthene - Benzo(k)fluoranthene - Chrysene -Dibenzo(a,h)anthracene - Indeno(1,2,3-cd)pyrene - Naphthalene	pH Flow Rate[6]	PAHs[3]: - Benzo(a)anthracene - Benzo(a)pyrene - Benzo(b)fluoranthene - Benzo(k)fluoranthene - Chrysene -Dibenzo(a,h)anthracene - Indeno(1,2,3-cd)pyrene - Naphthalene
Deicing Episode (2/Deicing Season)	Not Required	Ethylene Glycol Propylene Glycol BOD5[4] COD[5] Total Ammonia Nitrogen Nonylphenol Tolytriazole	Not Required	Ethylene Glycol Propylene Glycol BOD5[4] COD[5] Total Ammonia Nitrogen Nonylphenol Tolytriazole	Not Required	Not Required
Whole Effluent Toxicity (1st and 3rd Year Deicing Season)	Not Required	Menidia beryllina Arbacia punctulata	Not Required	Menidia beryllina Arbacia punctulata	Not Required	Not Required
Treatment System Sampling (Internal Outfalls)[7]	pH Quanity, Gallons	Oil and Grease TSS[1] Benzene[2]	Not Required	Not Required	Not Required	Not Required

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Table J-1 NPDES Permit Stormwater Outfall Monitoring Requirements (Continued)

	Northwest Outfall 005		Porter Outfall 003 (3 upstream locations)		Select Runway/Perimeter Outfalls	
Monitoring Event	Field Measurement	Laboratory Analysis	Field Measurement	Laboratory Analysis	Field Measurement	Laboratory Analysis
Monthly Dry Weather	Not Required	Not Required	Not Required	Oil and Grease TSS[1] Benzene Surfactant Fecal Coliform Enterococcus	Not Required	Not Required
Monthly Wet Weather	Not Required	Not Required	pH Flow Rate	Oil and Grease TSS[1] Benzene[2] Surfactant Fecal Coliform Enterococcus	Not Required	Not Required
Quarterly Wet Weather	pH Flow Rate[6]	Oil and Grease TSS[1] Benzene[2]	pH Flow Rate[6]	PAHs[3]: - Benzo(a)anthracene - Benzo(a)pyrene - Benzo(b)fluoranthene - Benzo(k)fluoranthene - Chrysene -Dibenzo(a,h)anthracene - Indeno(1,2,3-cd)pyrene - Naphthalene	pH	Oil and Grease TSS[1] Benzene[2]
Deicing Episode (2/Deicing Season)	Not Required	Not Required	Not Required	Ethylene Glycol Propylene Glycol BOD5[4] COD[5] Total Ammonia Nitrogen Nonylphenol Tolytriazole	Not Required	Ethylene Glycol Propylene Glycol BOD5[4] COD[5] Total Ammonia Nitrogen Nonylphenol Tolytriazole
Whole Effluent Toxicity (1st and 3rd Year Deicing Season)	Not Required	Not Required	Not Required	Menidia beryllina Arbacia punctulata	Not Required	Not Required
Treatment System Sampling (Internal Outfalls)[7]	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required

Notes:
1 TSS - Total Suspended Solids
2 Benzene must be collected with HDPE bailer.
3 PAH - Polynuclear Aromatic Hydrocarbons
4 BOD5 - Biological Oxygen Demand
5 COD - Chemical Oxygen Demand
6 Flow Rate will be estimated based on measured precipitation and the hydraulic model developed for the Logan Airport drainage system.
7 Outfalls 001D and 001E samples collected by Swissport.

Table J-2 Logan Airport 2007 Stormwater Outfalls Monitoring Results – First through Third Quarters

		North Outfall Sampling Results			West Outfall Sampling Results			Porter Outfall		Maverick Outfall	
Date	Weather	O&G[1]	SS[2]	pH[3]	O&G	SS	pH	O&G	pH	O&G	pH
First Quarter 2007											
January 24	Dry	<5.0	<0.1	6.9	5.5	<0.1	6.5	<5.0	6.5	<5.0	6.5
January 8	Wet	6.0	<0.1	8.4	<5.0	<0.1	8.0	<5.0	7.5	<5.0	7.9
January 9	After wet	<5.0	<0.1	8.2	<5.0	<0.1	7.2	<5.0	7.3	<5.0	7.2
February 22	Dry	<5.0	<0.1	8.0	6.8	<0.1	8.0	<5.0	7.8	<5.0	7.9
February 14	Wet	8.5	<0.1	NC	NC	NC	NC	NC	NC	<5.0	NC
February 27	After wet	9.1	<0.1	8.0	9.8	<0.1	8.3	9.8	7.9	<5.0	7.7
March 20	Dry	<5.6	<0.1	8.1	<5.0	<0.1	8.1	<5.0	8.1	<5.0	8.0
March 26	Wet	<5.0	<0.1	7.8	<5.0	<0.1	7.9	<5.0	8.0	<5.0	8.1
March 27	After wet	<5.0	<0.1	8.1	<5.0	<0.1	8.0	<5.0	8.0	<5.0	8.0
Minimum:		<5.0	<0.1	6.9	<5.0	<0.1	6.5	<5.0	6.5	<5.0	6.5
Average:		2.6	<0.1	7.9	2.8	<0.1	7.8	1.2	7.6	<5.0	7.7
Maximum:		9.1	<0.1	8.4	9.8	<0.1	8.3	<5.0	8.1	<5.0	8.1
Second Quarter 2007											
April 10	Dry	<5.0	<0.1	8.27	<5.0	<0.1	8.23	<5.0	8.33	<5.0	8.13
April 12	Wet	<5.0	<0.1	8.20	<5.0	<0.1	8.25	<5.0	8.11	<5.0	8.45
April 13	After wet	<5.0	<0.1	8.09	<5.0	<0.1	8.10	<5.0	8.17	8.2	7.89
May 7	Dry	<5.0	<0.1	8.01	<5.0	<0.1	7.99	<5.0	7.97	<5.0	8.02
May 16	Wet	<5.0	<0.1	8.28	<5.0	<0.1	8.47	<5.0	8.10	<5.0	8.15
May 17	After wet	<5.0	<0.1	8.36	<5.0	<0.1	8.17	<5.0	8.20	<5.0	8.26
June 19	Dry	<5.0	<0.1	7.99	<5.0	<0.1	7.98	<5.0	8.03	<5.0	8.20
June 20	Wet	<5.0	<0.1	8.13	<5.0	<0.1	8.07	<5.0	8.10	<5.0	8.09
June 21	After wet	<5.0	<0.1	7.99	<5.0	<0.1	8.04	<5.0	8.02	<5.0	8.15
Minimum:		<5.0	<0.1	7.99	<5.0	<0.1	7.98	<5.0	7.97	<5.0	7.89
Average:		<5.0	<0.1	8.15	<5.0	<0.1	8.14	<5.0	8.11	0.91	8.15
Maximum:		<5.0	<0.1	8.36	<5.0	<0.1	8.47	<5.0	8.33	8.2	8.45
NPDES Permit Limits (Permit # MA 0000787)											
Daily Minimum:				6.0			6.0		6.0		6.0
Daily Average:			0.1			0.1					
Daily Maximum:		15.0	0.3	8.5	15.0	0.3	8.5	15.0	8.5	15.0	8.5

Table J-2 Logan Airport 2007 Stormwater Outfalls Monitoring Results – First through Third Quarters (Continued)

		North Outfall Sampling Results			West Outfall Sampling Results			Porter Outfall		Maverick Outfall	
Date	Weather	O&G[1]	SS[2]	pH[3]	O&G	SS	pH	O&G	pH	O&G	pH
Third Quarter 2007											
July 18	Dry	<5.0	<0.1	8.34	<5.0	<0.1	8.23	<5.0	8.01	<5.0	7.91
July 28	Wet	<5.0	<0.1	8.41	<5.0	<0.1	8.37	<5.0	8.39	<5.0	8.30
July 29	After wet	<5.0	<0.1	8.20	<5.0	<0.1	8.26	<5.0	8.22	<5.0	8.24
August 23	Dry	<5.1	<0.1	7.41	<5.0	<0.1	7.59	<5.0	7.16	<5.0	7.88
NC	Wet										
NC	After wet										
September 21	Dry	<5.0	<0.1	7.34	<5.0	<0.1	7.21	<5.0	7.20	<5.0	7.62
NC	Wet										
NC	After Wet										
Minimum:		<5.0	<0.1	7.34	<5.0	<0.1	7.21	<5.0	7.16	<5.0	7.62
Average:		<5.05	<0.1	7.94	<5.0	<0.1	7.93	<5.0	7.80	<5.0	7.99
Maximum:		<5.1	<0.1	8.41	<5.0	<0.1	8.37	<5.0	8.39	<5.0	8.30
NPDES Permit Limits (Permit # MA 000787)											
Daily Minimum:				6.0			6.0		6.0		6.0
Daily Average:			0.1			0.1					
Daily Maximum:		15.0	0.3	8.5	15.0	0.3	8.5	15.0	8.5	15.0	8.5

Notes:
1 Oil and grease analysis by EPA Method 1664. Reported in mg/l.
2 Total settleable solids analysis by EPA Method 160.5. Reported in ml/l.
3 pH measured in the field and reported in standard pH units.
NC Samples could not be collected due to insufficient rainfall.
< Indicates constituent not detected above given limit. A value of zero is assumed for these samples in order to calculate an average value for the quarter.
Results in boldface represent permit limit exceedances. Exceedances of the NPDES Permit limits are reported to the EPA within 5 days of becoming aware of such exceedances.

Table J-3 Logan Airport 2007 Stormwater Outfalls Monthly Monitoring Results for Fourth Quarter

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (ug/L)	Surfactant (mg/L)	Fecal Coliform (cfu/100mL)	Enterococcus (cfu/100mL)
001A – North Outfall	10/19/2007	Wet Weather	2.06	0.22	7.38	<5.0	34	<2.0	0.42	73,000	1,700
002A – West Outfall	10/19/2007	Wet Weather	7.56	0.80	7.31	<5.3	34	<2.0	0.07	590	<10
004A – Maverick Street Outfall	10/19/2007	Wet Weather	0.57	0.06	7.63	<5.0	93	<2.0	<0.05	40	160
001C – North Outfall	10/17/2007	Wet Weather	–	–	–	<5.0	18	<2.0	0.08	8,300	20
002C – West Outfall	10/17/2007	Dry Weather	–	–	–	<5.0	47	<2.0	0.06	270	<10
004C – Maverick Street Outfall	10/17/2007	Dry Weather	–	–	–	<5.0	72	<2.0	<0.05	30	10
001A – North Outfall	11/3/2007	Wet Weather	2.73	0.30	7.55	<5.1	34	<2.0	0.22	NS	NS
002A – West Outfall	11/3/2007	Wet Weather	10.04	1.1	7.61	<5.0	16	<2.0	0.11	NS	NS
004A – Maverick Street Outfall	11/3/2007	Wet Weather	0.76	0.083	8.05	<5.2	52	<2.0	0.17	NS	NS
001A – North Outfall	11/26/2007	Wet Weather[1]	2.73	0.30	7.3	NC	NC	NC	NC	2,600	600
002A – West Outfall	11/26/2007	Wet Weather[1]	10.04	1.1	7.25	NC	NC	NC	NC	510	720
004A – Maverick Street Outfall	11/26/2007	Wet Weather[1]	0.76	0.083	7.25	NC	NC	NC	NC	3,400	1,700
001C – North Outfall	11/29/2007	Dry Weather	–	–	–	<5.0	46	<2.0	0.05	2,500	190
002C – West Outfall	11/29/2007	Dry Weather	–	–	–	<5.0	48	<2.0	<0.05	10	20
004C – Maverick Street Outfall	11/29/2007	Dry Weather	–	–	–	7.9	63	<2.0	<0.05	30	20
001A – North Outfall	12/20/2007	Wet Weather	2.76	0.49	7.78	<5.0	60	<2.0	0.42	5,000	1,800
002A – West Outfall	12/20/2007	Wet Weather	10.16	1.80	7.93	<5.0	86	<2.0	0.15	760	390
004A – Maverick Street Outfall	12/20/2007	Wet Weather	0.77	0.136	7.74	<5.0	210	<2.0	0.14	280	340
005Q – Northwest Outfall	12/20/2007	Wet Weather	0.08								
001C – North Outfall	12/13/2007	Dry Weather	–	–	–	<5.0	58	<2.0	0.47	410	5,000
002C – West Outfall	12/13/2007	Dry Weather	–	–	–	<5.0	240	<2.0	0.09	1,100	160
004C – Maverick Street Outfall	12/13/2007	Dry Weather	–	–	–	<5.0	260	<2.0	<0.05	<10	<10
Discharge Limitations											
Maximum Daily			Report	Report	6.0 to 8.5	15 mg/L	100 mg/L	Report	Report	Report	Report
Average Daily			Report	Report	6.0 to 8.5	–	Report	Report	Report	Report	Report

Notes: Flow rates were estimated for outfalls 001, 002, and 004 by using daily precipitation data, assuming 95 percent runoff of impervious area of the outfall catchments.
Results in boldface represent permit limit exceedances. Exceedances of the NPDES Permit limits are reported to the EPA within 5 days of becoming aware of such exceedances.
Even though the new NPDES permit came into effect on September 29, 2007 monthly monitoring results for the fourth quarter were only available for the North, West and Maverick Street Outfalls.
Because the Porter Street Outfall is a combined sewer overflow for the Boston Water and Sewer Commission, the new NPDES permit gave Massport until March 27, 2008 to develop and implement a monitoring program that will characterize stormwater quality related to airport activities in the Porter Street Drainage Area, rather that characterizing stormwater quality associated with both airport activities and overflows of sewage as it did under the former NPDES permit.

TSS Total Suspended Solids
NC Not Collected
1 Samples and field measurements collected during a second wet weather sampling event conducted on November 26, 2007.

Table J-4 Logan Airport 2007 Quarterly Monitoring Results for Fourth Quarter – North, West and Maverick Street Stormwater Outfalls

		Wet Weather								
	Date	Benzo(a)-anthracene (ug/L)	Benzo(a)-pyrene (ug/L)	Benzo(b)-fluoranthene (ug/L)	Benzo(k)-fluoranthene (ug/L)	Chrysene (ug/L)	Dibenzo(a,h,)-anthracene (ug/L)	Indeno(1,2,3-cd)-pyrene (ug/L)	Naphthalene (ug/L)	Total PAHs (ug/L)
001Q - North Outfall	12/20/2007	1.3	1.8	4.0	0.82	1.9	<0.1	1.5	2.3	32.86
002Q - West Outfall	12/20/2007	1.3	1.5	3.1	0.57	2.4	0.26	1.3	1.7	34.31
004Q - Maverick Street Outfall	12/20/2007	0.34	0.28	0.64	0.17	0.51	<0.11	0.23	<0.11	4.99
Discharge Limitations										
Maximum Daily		Report	Report	Report	Report	Report	Report	Report	Report	Report Total

Notes: Even though the new NPDES permit came into effect on September 29, 2007 fourth quarter 2007 monitoring results were only available for the North, West and Maverick Street Outfalls. Because the Porter Street Outfall is a combined sewer overflow for the Boston Water and Sewer Commission, the new NPDES permit gave Massport until March 27, 2008 to develop and implement a monitoring program that will characterize stormwater quality related to airport acti0991504vities in the Porter Street Drainage Area, rather that characterizing stormwater quality associated with both airport activities and overflows of sewage as it did under the former NPDES permit.

Table J-5 Logan Airport 2007 Quarterly Monitoring Results for Fourth Quarter – Northwest Stormwater Outfall

		Wet Weather				
	Date	Flow (MGD)	pH (SU)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (ug/L)
005Q - Northwest Outfall	12/20/2007	0.08	7.47	<5.0	92	<2.0
Discharge Limitations						
Maximum Daily		Report	Report	Report	Report	Report

Notes: The new NPDES permit came into effect on September 29, 2007 but gave Massport until March 27, 2008 to develop an Airfield Stormwater Outfall Sampling Plan which will require quarterly wet weather sampling at a minimum of seven of the airfield stormwater outfalls.

Table J-6 History of Logan Airport Stormwater Outfall NPDES Water Quality Monitoring Results – 1993 to 2006

	1993	1994	1995	1996	1997	1998	1999	2000	2001[1]	2002	2003[1]	2004	2005	2006
Oil and Grease (mg/L)														
North Outfall	30/31	35/36	33/35	29/35	30/35	35/36	29/30	34/36	28/28	36/36	30/32	32/34	33/35	33/33
West Outfall	29/30	36/36	34/34	36/36	34/35	36/36	30/30	35/35	27/28	36/36	31/32	33/34	35/35	32/33
Porter Street Outfall	30/30	35/36	34/34	36/36	35/35	34/36	30/30	35/36	28//28	34/36	32/32	33/34	34/35	33/33
Maverick Street Outfall	29/29	36/36	35/35	36/36	35/35	35/36	30/30	34/34	26/28	35/36	32/32	34/34	35/35	32/33
Settleable Solids (ml/L)														
North Outfall	19/19	34/35	34/35	32/35	31/34	34/36	30/30	34/36	29/29	32/36	32/32	34/34	33/35	32/34
West Outfall	19/19	32/36	34/34	35/36	34/34	35/36	29/30	36/36	27/28	36/36	31/32	34/34	32/35	33/33
pH														
North Outfall	34/35	33/36	35/35	35/35	35/35	36/36	30/30	36/36	29/29	36/36	32/32	34/34	35/35	34/34
West Outfall	34/34	28/36	33/34	35/36	35/35	36/36	30/30	36/36	29/29	36/36	32/32	34/34	35/35	33/33
Porter Street Outfall	35/35	30/36	34/34	36/36	35/35	36/36	30/30	36/36	28/28	36/36	32/32	34/34	35/35	33/33
Maverick Street Outfall	35/35	35/36	35/35	36/36	34/35	36/36	30/30	35/35	28/28	36/36	32/32	34/34	35/35	33/33

Notes: Stormwater outfall water quality monitoring results collected in accordance with the requirements of former NPDES permit. A portion of the Porter Street Drainage Area was incorporated into the West Drainage Area as part of the roadway construction projects at Logan Airport.
30/32 = Number of samples at or below NPDES limits/Total number of samples taken.
In 2001 and 2003, exceptional weather, tidal conditions, or insufficient discharge precluded the collection of some samples, leading to a fewer number of samples collected than in other years.

Table J-7 History of Logan Airport Oil and Hazardous Material Spills[1] and Jet Fuel Handling – 1990 to 2007

Year	Total Number of all Spills	Total Number of all Spills >10 gallons	Total Volume of all Spills (Gallons)	Estimated Volume of Jet Fuel Handled (Gallons)	Total Volume of Jet Fuel Spilled (Gallons)
1990	173	NA	NA	438,100,000	3,745
1991	186	NA	NA	NA	2,471
1992	195	NA	NA	NA	4,355
1993	188	NA	NA	451,900,000	3,131
1994	217	NA	NA	476,700,000	4,046
1995	161	NA	NA	309,200,000	21,412[2]
1996	159	NA	NA	346,700,000	1,321
1997	147	NA	NA	377,488,161	2,029[3]
1998	191	NA	NA	387,224,004	10,047[4]
1999	196	43	7,151	425,937,051	7,012[5]
2000	136	20	1,318	441,901,932	1,227
2001	139	37	1,924	416,748,819	1,771
2002	101	16	653	358,190,362	559
2003	128	19	10,364	319,439,910	10,188[6]
2004	126	18	894	373,996,141	574
2005	97	15	2,319	368,645,932	585
2006	92	11	752	364,450,864	644
2007	108	7	604	367,585,187	361

Source: Massport Fire-Rescue Department.
NA Not available.
Notes:
1 Materials include: jet fuel, hydraulic oil, diesel fuel, gasoline, and other materials such as glycol and paint.
2 One tenant spill, which occurred on October 15, 1995, totaled 18,000 gallons (84 percent of the annual spill total). The spill did not enter the Airport's storm drain system.
3 On October 23, 1997, a fuel line on an aircraft failed, resulting in the release of approximately 2,500 gallons, all but 60 gallons of which were recovered in drums before reaching the ground. Only the 60 gallons is included in the 1997 total.
4 Includes a 7,200-gallon spill that was discovered on September 2, 1998, and a 1,300-gallon spill that occurred on June 3, 1998. Neither spill entered the Airport's storm drain system.
5 Includes a 5,000-gallon spill, none of which entered the Airport's storm drainage system.
6 One fuel spill comprised 9,460 gallons or 94 percent of the total volume of the MA DEP/MCP reportable spills. The fuel spill was contained and did not enter the drainage system.

Table J-8 Type and Quantity of Oil and Hazardous Material Spills at Logan Airport – 1999 to 2007

	Jet Fuel			Hydraulic Oil			Diesel Fuel			Gasoline			Other		
Year	No. of Spills	Quantity (Gallons)	No. of Spills ≥10 Gallons	No. of Spills	Quantity (Gallons)	No. of Spills ≥10 Gallons	No. of Spills	Quantity (Gallons)	No. of Spills ≥10 Gallons	No. of Spills	Quantity (Gallons)	No. of Spills ≥10 Gallons	No. of Spills	Quantity (Gallons)	No. of Spills ≥10 Gallons
1999	151	7,012	40	24	67	1	13	49	2	5	7	0	3	16	0
2000	115	1,227	18	8	59	2	3	11	0	8	16	0	2	5	0
2001	104	1,771	32	21	92	3	5	30	1	6	26	1	3	5	0
2002	79	559	15	7	38	0	8	37	1	4	8	0	3	11	0
2003	89	10,188	15	15	91	3	15	30	0	7	24	0	2	31	1
2004	82	574	12	17	189	4	14	52	0	7	26	0	6[1]	53[2]	2[3]
2005	66	585	12	14	78	1	7	1,610	2	7	45	0	3[4]	1	0
2006	65	644	9	10	25	0	6	57	1	4	9	0	7	17	1
2007	66	361	4	16	37	0	16	57	1	3	8	0	7	141	2[5]

Notes:

1 Includes two Unknown spills (14 gallons), plus one spill of each of the following: Ethylene Glycol, Propylene Glycol, AVGAS, and Paint.

2 Ethylene Glycol (25 gallons), Propylene Glycol (10 gallons), AVGAS (1 gallon) and Paint (3 gallons).

3 One spill of Ethylene Glycol; one spill of Propylene Glycol.

4 Includes two spills of an unknown substance and volume.

5 Includes one spill of motor oil (4 gallons); one spill of kerosene (5 gallons); one spill of cooking oil (120 gallons); one spill of fuel oil (10 gallons); one spill from a battery (1 gallon); two spills of an unknown substance (1 gallon).

EnviroNews

Logan – Facilities II ISO 14001 Certified

In December 2006 Facilities II at Logan Airport was certified to the ISO 14001 standard by a third party registrar making Field Maintenance the fourth Massport facility (the first at Logan) to have a certified environmental management system (EMS).

For most of 2006 a team of individuals from Massport were developing the EMS that will be implemented at Facilities II. The basis for the EMS is the Environmental Management Policy that provides the framework for Massport's EMS and other environmental goals. The EMS included objectives and targets for the following programs: air emissions; waste management; solid waste; spill prevention; resource use; and stormwater.

ISO 14001 is a voluntary international standard issued in 1996 and updated in 2004 by the International Organization for Standardization. It identifies elements of an EMS necessary for an organization to effectively manage its impact on the environment. The ultimate objective of the standard is to integrate the EMS with overall business considerations and to continually improve environmental performance at a facility.

Work has begun on the development of an ISO 14001 EMS at Facilities I and III at Logan. These systems should be completed by the end of 2007.

2006 Recycling Data is in…

19,152 pounds of paper were recycled at the Fish Pier in 2006

This results in preventing **162.79** trees from being cut down and saved **28.73** cubic yards of landfill.

Thanks to all who participate in the program.

Regulatory Update

EPA Sets Inspectors Loose in 2007

In 2006 the Environmental Protection Agency (EPA) forced industry to pay $4.8 billion in fines and pollution control investments to settle compliance violations. In addition, for more serious issues the EPA put corporate officials behind bars for a total of 154 years.

Key areas where companies are at risk include:

- Obtaining new source review permits when modifying operations
- Meeting emission limitations
- Obtaining a stormwater permit and controlling runoff
- Notifying local emergency response agencies about hazardous chemical storage and releases
- Developing spill prevention plans
- Following hazardous waste rules
- Updating risk management plans

New Deadlines for Spill Plans

Facilities that meet the thresholds for the requirement of implementing a Spill, Prevention, Control and Countermeasures (SPCC) Plan have new deadlines for implementation. The thresholds are: 2 discharges of ≥ 42 gallons in any 12 month period or storage of 1320 gallons of oil products in containers ≥ 55 gallons. If your facility meets one of these a Plan is required and the following deadlines must be adhered to.

Facilities that began operating before August 16, 2002 should already have an SPCC (Spill, Prevention, Control and Countermeasure) Plan in place and must update them by October 31, 2007. Facilities that began operations between August 16, 2002 and October 31, 2007 must have SPCC plans in place by October 31, 2007.

For more information go to the EPA web site at www.epa.gov/oilspill.

IN THE NEWS

Excessive Cardboard Disposal Found

The Massachusetts Department of Environmental Protection (MassDEP) reported in early January that a number of well-known Massachusetts businesses and institutions continue to throw away large volumes of easy-to-recycle cardboard in spite of a state ban on its disposal, savings on disposal costs and its value as a commodity. For the first time, the agency has taken enforcement actions against waste ban violators.

MassDEP estimates that over 1.5 million tons of paper products are still being disposed in landfills and incinerators across the state every year at an average cost of $70 per ton - up to $105 million in recycling savings for business and communities.

As part of a statewide campaign to cut down on continued disposal of cardboard and other easy-to-recycle materials, MassDEP sent inspectors to a number of solid waste facilities around the state during the fall of 2006 to monitor compliance with regulatory waste bans.

Continued next column

EnviroQuestion

Question: Daylight Savings Time began 3 weeks earlier this year as required by the Energy Policy Act of 2005. How much energy will this save each day?

Answer in the next issue.

Quarter IV Question: Fluorescent bulbs last longer than regular bulbs by what ratio?

Answer: 10 to 1

Cardboard *continued*

Waste hauling companies cited were: Allied Disposal of Quincy, BFI Waste Systems of Revere and Yarmouth, Frade's Disposal of New Bedford, and Waste Management of South Hadley and Stoughton.

Nine facilities that generated the material: American Red Cross of Dedham, Building 19 of Lynn, Ethan Allen Furniture of Bellingham, Friendly Fruit of New Bedford, Home Depot stores in Hyannis and Wareham, Lindenmeyr Munroe of Franklin, Westfield State College of Westfield, and Wright Line of Worcester.

Each violator was issued a notice of noncompliance with the waste ban regulation, and required to draw up a plan to stop the disposal of banned materials and submit the plan to MassDEP for approval.

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For Your Information

EPA Cultivates Water-Efficient Landscapes

The Environmental Protection Agency (EPA) is issuing its first WaterSense label for landscape irrigation. As part of the new water-efficiency partnership program two certification programs for landscape irrigation professionals received the WaterSense label for their adherence to water-saving techniques.

The first WaterSense label has been issued to the Irrigation Association's (IA) Certified Irrigation Designer program and Certified Irrigation Contractor program. To earn the WaterSense label, IA's certification programs must test for the ability to design, install and maintain water-efficient landscape and irrigation services to consumers. EPA is inviting professionals through these programs who share a commitment to water efficiency to become partners and help consumers save water and money while maintaining their yards.

WaterSense is a voluntary public-private partnership that identifies and promotes high-performance products and programs that help preserve the nation's water supply. The WaterSense program seeks to generate support for consumer use of water-efficient products such as high-efficiency toilets, water-saving faucets, and, in the future weather-based controllers and soil moisture sensors for lawns and gardens.

For more go to www.epa.gov/watersense

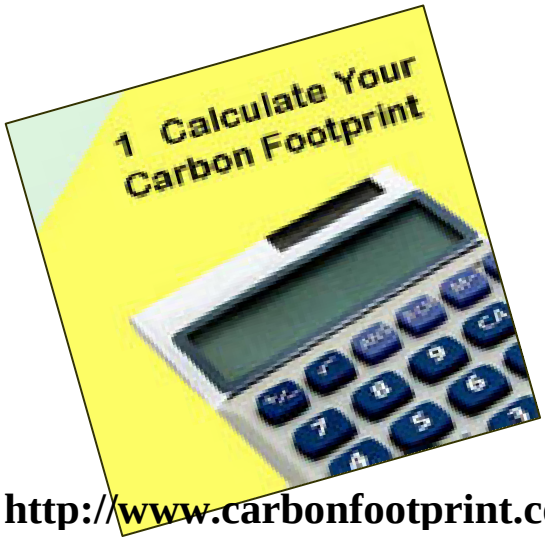
From EPA News Release, Feb 22, 2007.

EnviroNews

Environmental Fun Facts

In the United States, more than 25 million acres of turfgrass provide environmental benefits, such as:

- 625 square feet of turf provides enough oxygen for one person for one day
- On an average block of eight houses, front lawns have the cooling effect of 70 tons of air conditioning
- Turf absorbs gaseous pollutants such as carbon dioxide, converting them to oxygen
- Turf traps an estimated 12 million tons of dust and dirt released annually into the atmosphere
- Turf prevents soil erosion, filters contaminants from rainwater and reduces runoff



http://www.carbonfootprint.com

EnviroQuestion

Question: What is your carbon footprint?

Answer in the next issue.

Quarter I Question: Daylight Savings Time began 3 weeks earlier this year as required by the Energy Policy Act of 2005. How much energy will this save each day?

Answer: 1 percent

Regulatory Update

Diesel Sulfur Content Slashed

- Under a 2004 EPA clean-air regulation, refineries must reduce current sulfur content in diesel used in locomotives, marine vessels and land-based nonroad engines from 3,000 ppm to 500 ppm.
- As of June 2006, 80 percent of highway diesel must be ultra low sulfur, which is 15 or fewer ppm. Nonroad engine diesel will be required to meet the same ultra low sulfur standard by 2010. Locomotive and marine fuel must meet these levels by 2012.

Go to http://www.epa.gov/cleandiesel for more information

Permitting Process Improved

Massachusetts Governor Duval Patrick announced initiatives to streamline the environmental permitting process. The goal of the new approach is to speed up decision making in the regulatory process so the Massachusetts Department of Environmental Protection (DEP) can concentrate on more pressing environmental concerns.

The three proposed initiatives are:

1) Reduction of Permit Timelines: Proposed regulations will reduce timelines for the majority of its permit categories by 20 percent. The DEP has also committed to issuing 90 percent of all permits in 180-days or less.

2) Specific Permit Categories Targeted for Streamlining: The categories have historically had delays in decisions that exceeded the 180-day goal. These include: air quality permits; Chapter 91 licenses for land-based development; and groundwater discharge permits for wastewater.

3) Streamlining the Adjudicatory Appeals Process: Reform of wetlands appeals will allow for more timely action on vital projects.

Did You Know?

Current national recycling efforts reduce greenhouse gas emissions by 49.9 million metric tons of carbon equivalent. This is the same as the annual greenhouse gas emissions from 39.6 million passenger cars.

IN THE NEWS

Pepsi Fined

The Massachusetts Department of Environmental Protection (MADEP) has entered into a Consent Order and fined the Pepsi Bottling Group in Taunton for Hazardous Waste violations. During an inspection by the MADEP it was determined that the facility was registered as a Very Small Quantity Generator of waste oil but should have been registered as a Small Quantity Generator and no emergency numbers were posted near the storage area.

MIT, Somerville Metals Processor Face Penalties

The Massachusetts Institute of Technology (MIT) in Cambridge and a metals processing facility in Somerville have been penalized a total of $73,423 by the MADEP for violations connected to the handling, transport and attempted disposal of an old transformer that contained oil.

Continued next column



NEWS continued

The penalties arose from an incident in November 2005, when employees of MIT discovered a disconnected transformer on MIT property and transported the transformer over public roads, the second time to the Prospect Iron and Steel/Anestis Metal site.

While unloading the transformer at the Somerville facility, the transformer was damaged and began leaking oil. The driver then took the transformer to a nearby shopping mall.

After notifying MADEP of the release, MIT's environmental staff and a cleanup contractor remediated the estimated 20-gallon release and ultimately determined that the oil did not contain PCBs.

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FOR YOUR INFORMATION

What Can You Do About Climate Change?

The burning of fossil fuels releases carbon dioxide (CO_2) into the atmosphere and contributes to climate change. Reductions in these emissions can be made by improving your car's fuel efficiency.

Buy smart – before buying a car, check the Environmental Protection Agency's (EPA) Green Vehicle Guide and the jointly-run EPA/DOE Fuel Economy Guide.

Drive smart – many factors affect the fuel economy of our car. To improve fuel economy, go easy on the brakes and the gas pedal. Reduce idling time and unload unnecessary items from your car to reduce weight.

Tune your ride – a well-maintained car is more fuel-efficient, produces less greenhouse gas emissions and is more reliable. Keep you car well tuned and use the recommended grade of motor oil.

Check your tires – check your tire pressure regularly. Under-inflation increases tire wear, reduces fuel economy by up to 3 percent and leads to higher greenhouse gas emissions.

For more on what you can do on the road, at home or in the office go to http://www.epa.gov/wycd



EnviroNews

New to SmartWay™

Subaru of America announced that its 2008 Partial Zero Emission Vehicles (PZEV) Legacy, Outback and Forester naturally aspirated models have received EPA's SmartWay™ Certification. These vehicles are now listed in the Green Vehicle Guide that recommends the cleanest and most fuel-efficient vehicle choices.

The EPA Green Vehicle Guide uses emission level and fuel economy values to determine scores for cars and trucks. Vehicles with very good or superior environmental scores are indicated with the SmartWay or SmartWay Elite™.

Three pieces of information about a vehicle's environmental performance are presented: the Air Pollution Score; the Greenhouse Gas; and, if eligible, the SmartWay or SmartWay Elite designation. If you score well on both Air Pollution and Greenhouse Gas scores EPA assigns a SmartWay designation.

The Subaru PZEV's have 90 percent cleaner emissions than the average new vehicle. PZEV's are the cleanest vehicles available today and they meet emissions standards that are sometimes even cleaner than some hybrid or alternative fuel vehicles.

EnviroQuestion

Question: How much fuel is wasted annually in the United States due to traffic congestion?
a. 9.5 million gallons
b. .9 billion gallons
c. 1.5 trillion gallons
d. 5.1 trillion gallons

Answer in the next issue.

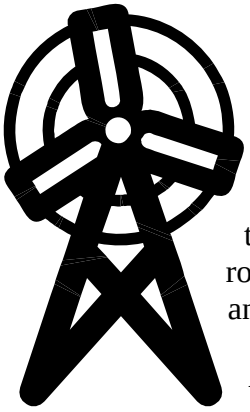
Quarter I Question: What is your carbon footprint?

Answer: Go to www.carbonfootprint.com to calculate yours.

Wind Energy: An Overview

The concept of wind energy is not new. Wind energy has been used for thousands of years with sailboats and wind mills to grind grain. Wind energy can either be used directly, as with these applications or it can be converted into electricity.

A wind-electric turbine generator works just like a hydroelectric generator. At hydropower stations throughout the U.S. and the world, the energy that is contained in falling or flowing water is used to spin the rotor if a turbine, and the turbine rotor drives the shaft of a generator to produce electricity.



Wind energy works in a very similar way. In the case of wind the "river" is an invisible one made of air, but the principle is the same. As the air flows past the rotor of a wind turbine, the rotor spins and drives the shaft of an electric generator.

A wind turbine's rotor capable of generating 1 megawatt of power would be approximately 175 feet across, this is much larger than that for a hydro turbine. The upside though is that wind is available across a larger geographical range than hydropower. About one-third of the country has enough wind to generate electricity economically.

Wind energy is appealing because it is essentially pollution-free. More than half of all the electricity that is used in the United States is generated from burning coal. This process causes large amounts of toxic metals, air pollutants, and greenhouse gasses to be emitted to the atmosphere.

Did You Know?

Insulating your attic reduces the amount of energy loss in most houses by 20 percent.

IN THE NEWS



Massachusetts Companies and Employees Make Headlines

The owner of Environmental Compliance Training was charged in federal court with falsely reporting that the school had training individuals in asbestos removal work. The indictment alleges that the company issued certificates to untrained people who were then given authorization from the Massachusetts Division of Occupational Safety to work in the asbestos removal industry.

The Massachusetts Department of Environmental Protection (MADEP) penalized a Holyoke company for air quality and hazardous waste violations. The violations were discovered at Dielectric Polymer, Incorporated, some of the hazardous waste violations included inadequate aisle spacing for storage of hazardous waste and failure to notify the MADEP of solvent recycling activities. The company agreed to pay an $8,000 penalty and has initiated corrective actions to address the issues.

Continued next column

A large Massachusetts-based property management companies may be subject to a significant penalty. The Chestnut Hill Realty Corp as well as the owners of the properties managed by the company violated the federal Lead Disclosure Rule when they failed to disclose information about lead paint to people who rented or purchased apartments in 2004 and 2005.

The purpose of the Lead Disclosure Rule is to provide residential renters and purchasers of pre-1978 housing with information so that they can make informed decisions about potential housing purchases or leases.

EPA Protection

Find out How EPA determines how to protect the environment. Environmental indicators are kinds of data that describe the condition of the land, water, and air.

Go to http://cfpub.epa.gov/eroe/

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FOR YOUR INFORMATION



Going Back to School Green

Here are some simple tips for being greener when choosing back to school supplies:

Reuse supplies: search for products that can used again, such as lunch bags, reusable containers, and refillable pens and pencils.

Buy in bulk: stock up on items that will be needed in the future to eliminate unnecessary repacking.

Buy recycled paper: purchase paper that is 100 percent post-consumer recycled and chlorine free, this reduces sold waste and emissions of dioxin.

Go organic: from clothing, food and other products, these are natural, chemical-free or locally produced.

Rethink transportation: ask the bus driver not to idle while waiting for kids, if the kids walk map out a safe route and carpool to decrease miles traveled.

From the Environmental Tip of the week September 5, 2007

EnviroNews

Regulatory Update

Proposed SPCC Amendments

The Environmental Protection Agency (EPA) has proposed revisions to the Spill Prevention Control and Countermeasures (SPCC) rule. The EPA says that these amendments will increase clarity and tailor certain requirements for easier and increased compliance. For more on the SPCC go to www.epa.gov/emergencies.

In The News



The EPA's program to enforce environmental laws in the six New England states resulted in significant pollution reduction and compliance assurance last year. In FY 2007, the criminal enforcement program opened 10 percent more environmental crimes cases than in 2006. Criminal fines and restitution also increased from the previous year by 46 percent. Between October 2006 and September 2007, these enforcement actions have realized pollution reductions by 13.7 million pounds, the second highest reduction in the past five years.

As a result of the increased enforcement, violators will pay more than $148 million in combined penalties and actions to correct violations. An additional $1.1 million is being committed to "supplemental environmental projects" which will yield environmental benefits to the community at large.

Under the Superfund enforcement program, nearly 14 billion gallons of water will be cleaned in Massachusetts. This is enough water to fill approximately 21,400 Olympic-sized swimming pools!

In New England, the EPA has put emphasis on reducing environmental crimes, preventing release of hazardous substances, promoting recycling of electronic wastes, reducing emissions of hazardous chemicals, superfund enforcement and sustainable water infrastructure. For the first time EPA has also compiled detailed Web-based data on enforcements available at EPA's region 1 site.

For more news go to page 2

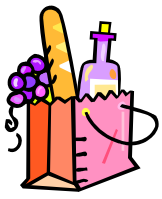
Recycling Facts

The average person in Massachusetts recycles seven pounds of paper and eight pounds of containers per week. Annual carbon dioxide savings from recycling: 700 pounds. Increasing recycling by one more pound of paper and one more pound of containers per week, contributes to an additional 50 pounds of carbon dioxide savings per year. Did you know that recycling also conserves energy? Each year recycling efforts save enough energy to power over 800,000 homes!

Go Green for the Holidays

Here are some tips to have a "greener" holiday season:

- Switch to energy efficient LED lights, instead of conventional incandescent lights. These lights will last up to 100,000 hours.
- Buy a live tree instead of an artificial one, Christmas tree crops are allowed to grow for ten years and that's good for the environment. The process used to make an artificial tree is not good for the environment. When you are done look into recycling your tree some towns take old trees and make them into mulch.
- Use your fireplace wisely. A fire in your fireplace can actually increase home heating costs. While the fire is going, warm air from the rest of the house is pulled up the chimney through the fireplace causing the furnace to kick on before it needs to, increasing fuel consumption and costs. To save money and use your fireplace more efficiently, try keeping the doors closed to the room where the fireplace is located.
- Try environmentally friendly wrapping, such as:
  - brown paper bags
  - your child's artwork
  - newspapers
  - a fabric gift bag or basket



News continued

United Airlines fined $85,000 for Hazardous Waste Violations

The California Department of Toxic Substances Control (DTSC), while performing a routine inspection in October 2006 at the airline's San Francisco International Airport Maintenance Operations Center, reported these violations:

- Hazardous waste storage longer than 90 days without a hazardous waste facility permit;
- Failure to fully inspect the structural integrity of several major tanks containing hazardous waste; and
- Failure to properly label hazardous waste storage tanks and container.

Bakery Fined for CFC Violations

The Piantedosi Baking Company a manufacturer of bread products in Malden, has agreed to pay a fine of $50,000 for Clean Air Act violations. In addition, the company will pay $25,000 to purchase renewable energy credits.

The Environmental Protection Agency (EPA) inspected the facilities to evaluate the company's compliance with federal stratospheric ozone-protection regulations and found that Piantedosi failed to document the type of repairs that were conducted on its refrigeration equipment, including leak-repair verification tests that had been performed. As part of the settlement the bakery will purchase renewable energy credits representing 27% of its electric power over two years.

EnviroQuestion

Question: How many pounds of CO2 are generated by the production of Patagonia's Synchilla Vest made of 85% recycled fleece?

Answer in the next issue.

Quarter 3 Question: How much fuel is wasted annually in the United States due to traffic congestion?
a. 9.5 million gallons
b. 2.9 billion gallons
c. 1.5 trillion gallons
d. 5.1 trillion gallons

Answer: 2.9 billion gallons of wasted fuel

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FOR YOUR INFORMATION

Understanding Air Quality

The same technology that you can use to zoom through the mountains or look at a satellite picture of your house can now be used to learn more about air emissions where you live.

The Environmental Protection Agency (EPA) has developed two tools that let computer users "see" air quality information on a virtual globe.



The first tool is part of the Air Emissions Sources website. This web site was designed to make emissions data for six common pollutants easy to find and easy to understand. User's can look at overall emissions, emissions by type of industry, or emissions by largest polluter.

Within this site you can also find out who emits the largest amount of certain emissions.

Additionally the EPA is providing Air Quality Index (AQI) information in a mapping format. You can click on a specific location to see the AQI forecast and current levels of ozone or particle pollution. Goto ww.epa.gov/air/emissions

K

2007 Peak Period Pricing Monitoring Report



BOSTON-LOGAN INTERNATIONAL AIRPORT MONITORING REPORT ON SCHEDULED AND NON-SCHEDULED FLIGHT ACTIVITY

Peak Period Surcharge Regulation 740 CMR 27:00: Massachusetts Port Authority

Report Number:	**004**
Monitoring Period:	**March 2007 – August 2007**
Report Issue Date:	**March 28, 2007**

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Note: This report reflects the Boston-Logan Airport flight activity monitoring under 740 CMR 27.03 Peak Period Surcharge Regulation on Aircraft Operations at Boston-Logan International Airport.

Findings: This report includes projected activity data for the Spring and Summer season, from March 2007 through August 2007. Current and projected near-term flight levels at Boston Logan are well below Logan's good weather (VFR) throughput of approximately 120 flights/hour. **As a result, average VFR delays are projected to be minimal and well below the 15 minutes threshold through August 2007.**

In the event demand conditions at the airport change significantly from the current projection, Massport will issue updates to this report.

Attachments

Table 1: Summary Overview of Peak Period Surcharge Program

Table 2: Summary Overview of Forecast Methodology

Table 3: Aircraft Operations at Logan Airport Projected through August 2007

Table 4: Projected Hourly Operations, Average Weekday of August 2007

Table 5: Forecast Logan Average Weekday Operations, March 2007 through August 2007

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Table 1: Summary Overview of Peak Period Surcharge Program

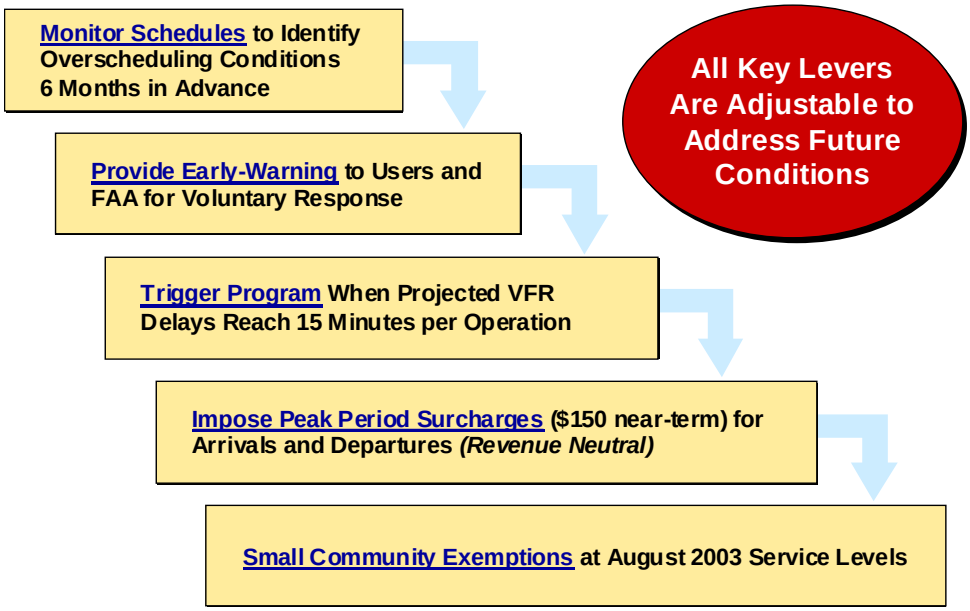


Table 2: Summary Overview of Forecast Methodology

- Scheduled passenger airline flights represent more than 85 percent of total aircraft operations. Passenger airline activity for the Fall and Winter periods were projected based on published advance airline schedules
- Forecasts of monthly activity for other segments (GA, Cargo, Charter) are based on the past three months of actual flight volume and historic patterns of monthly seasonality
- Day-of-week and time of day distributions for non-scheduled segments are based on analysis of Logan radar data
- Projections for each segment were combined to produce the forecast pattern of hourly flight activity for an average weekday, Saturday, and Sunday for the six month period from March 2007 through August 2007

Table 3: Aircraft Operations at Logan Airport, *Average Weekday Operations Projected Through August 2007*

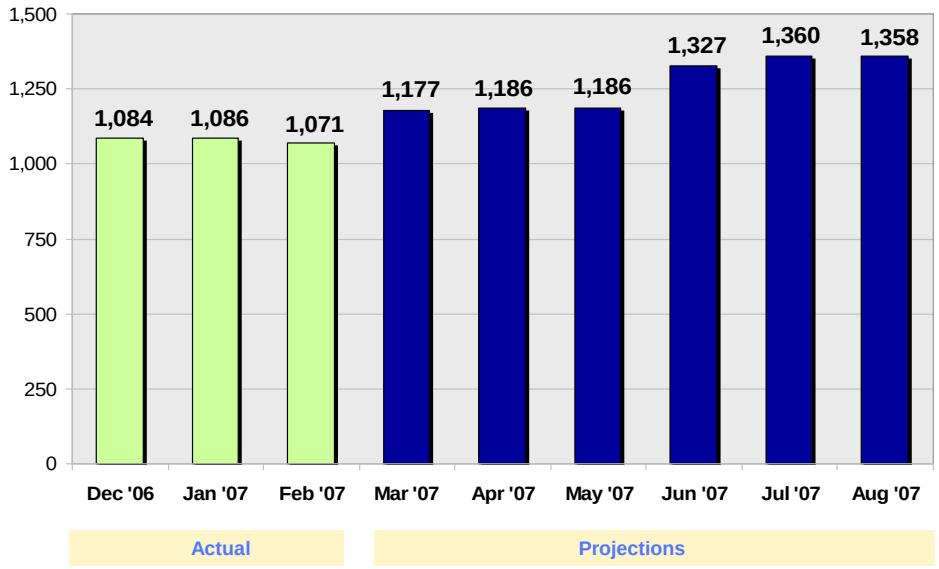
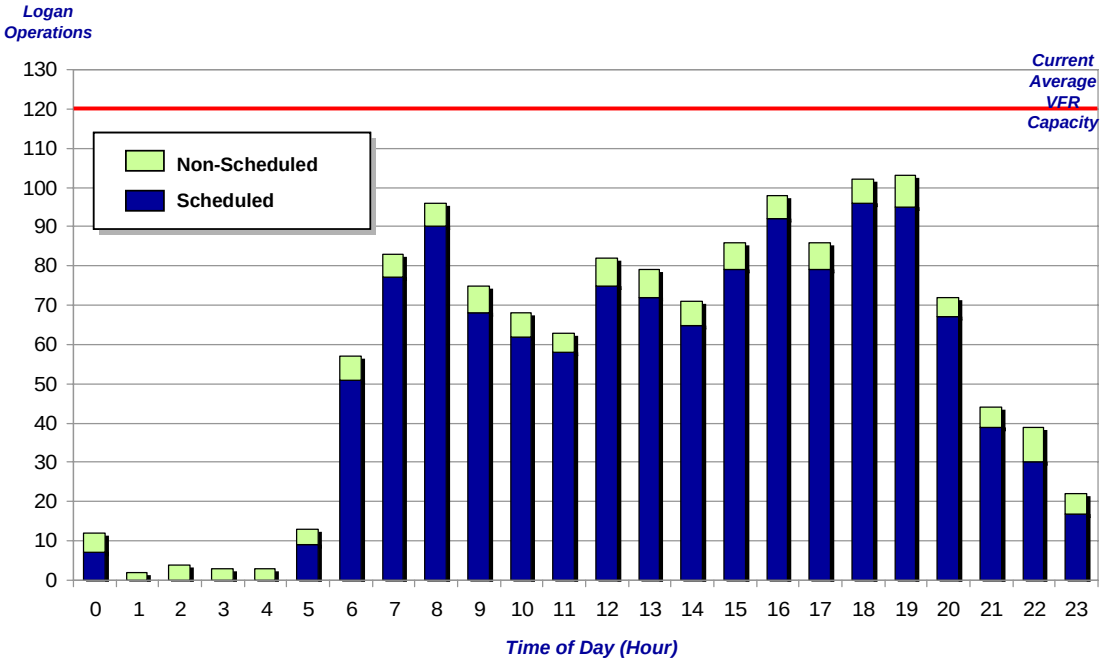


Table 4: Projected Hourly Operations, *Average Weekday, August, 2007*



Note: Includes projected services by scheduled airlines plus non-scheduled activity including general aviation, charter, and cargo operations.

Table 5: Forecast Logan Average Weekday Operations, *Mar. 2007– Aug. 2007*

	Forecast Weekday Operations					
Hr Range	Mar '07	Apr '07	May '07	Jun '07	Jul '07	Aug '07
0	9	8	9	12	12	12
1	2	3	3	2	2	2
2	4	4	4	4	4	4
3	2	3	3	3	3	3
4	3	3	3	3	3	3
5	13	13	12	13	13	13
6	54	60	61	56	56	56
7	78	74	73	81	83	83
8	80	84	87	95	96	96
9	67	67	65	73	74	74
10	60	60	60	65	68	68
11	65	61	56	60	62	62
12	62	62	67	80	82	82
13	60	64	61	77	79	79
14	61	60	59	68	71	71
15	72	77	78	82	86	86
16	83	83	85	95	97	97
17	77	77	72	83	86	86
18	86	86	94	100	102	102
19	83	82	79	100	102	102
20	61	58	60	69	71	71
21	35	36	36	44	44	44
22	40	39	38	38	38	39
23	20	22	21	22	22	22
Total	1,177	1,186	1,186	1,327	1,360	1,358